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THE PARASITIC HYMENOPTERA OF THE TERTIARY OF
FLORISSANT, COLORADO.

BY CHARLES T. BRUES.

WITH ONE PLATE.

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No. 1.—*The Parasitic Hymenoptera of the Tertiary of Florissant, Colorado.*

By CHARLES T. BRUES.

The present paper is based upon studies on the parasitic Hymenoptera contained in the very extensive collection of fossil insects made many years ago by Dr. Samuel H. Scudder at Florissant, Colorado, and now contained in the Museum of Comparative Zoölogy. In addition, Prof. T. D. A. Cockerell has sent me much material from the same locality obtained by expeditions under his charge during the summers of 1907 and 1908, most of this second series belonging to the American Museum of Natural History. In all I have had the opportunity to examine over 700 well-preserved specimens of insects belonging to this group, among which there are 112 clearly defined species which are described on the following pages. Adding to these the 13 species previously described by Professor Cockerell and the present writer, the total number so far found at Florissant is 125.

The very large number of species of parasitic Hymenoptera represented at Florissant shows it to be by far the richest locality in the world for these insects, as it has already been found to be by Scudder for many other groups. This is shown in the following table which gives a comparison between the several important places where fossil parasitic Hymenoptera have been found.

Number of Tertiary species of parasitic Hymenoptera found in various localities.

Horizon	Locality	Proctotrypoidea	Cynipoidea	Chalcidoidea	Ichneumonidae	Braconidae	Evanidae	Stephanidae	Totals
Miocene	Florissant	5	3	15	76	23	2	1	125
Upper Miocene	Oeningen	0	0	1	6	0	0	0	7
Lower Miocene	Radoboj	0	0	0	5	0	0	0	5
Lower Oligocene	Baltic Amber	1	3	12	15	6	2	0	39
Lower Oligocene	Aix, France	0	0	1	9	2	0	0	12

With the exception of a single genus and species (*Ephialtites*) from the Upper Jurassic, no parasitic Hymenoptera are known before the Tertiary. However, the quite typical character of *Ephialtites*, and the abundance in which the group appears in deposits of Lower Oligocene age show that it must have been clearly differentiated and well developed at least before the beginning of the Tertiary. The discovery of *Ephialtites* in rocks so much older than those in which other of the higher Hymenoptera have been found has led Handlirsch to derive both the parasitic and aculeate Hymenoptera from this type. In this I cannot agree with him and strongly suspect that the greater antiquity of *Ephialtites*, if it be a truly ichneumonoid form, must be only apparent, and due to our very imperfect knowledge of the earlier fossil insects. However this may be, we know from the Oligocene and Miocene an extremely large fauna which must of course represent only a small fragment of what actually existed. It will be seen from the taxonomic part of this paper that many species are known only from single specimens, which agrees well with what we find in collections of recent species belonging to this group, and evidences not only their very general occurrence but their high degree of differentiation into numerous closely allied species.

The beautiful preservation of most of the Florissant species makes it possible to refer the great majority of them to living genera with a considerable degree of certainty — that is of course speaking of recent genera in the wide sense as used by the older writers. In some cases it has been possible to place species with still greater certainty, and in these cases the name of the more modern subdivision or genus in the restricted sense has been employed. Even in the case of specimens too poorly preserved to describe, I have rarely been in doubt as to the family to which they should be referred, and well-preserved specimens are usually easily placed in the subfamilies and genera if one is familiar with the details of structure in modern forms, and willing to scrutinize the fossils with great care. This last is extremely important for one is often badly deceived at first sight by obliterated or unduly prominent structures.

On the whole, the wings are the most important characters to be studied. They are usually well preserved, generally lying between the laminae of the shale where it splits in exposing the specimen. Very few specimens show well-preserved legs, although the hind femora and tibiae often show quite prominently. As a rule the specimens can be studied advantageously under a rather strong magnification, and most of those which I have described were examined under a

compound microscope with two-thirds objective and two inch eye-piece.

Since many of the details are indicated by color rather than surface structure, it is necessary to examine both by obliquely reflected light and by as nearly vertical illumination as possible. The latter can be obtained either by using an objective furnished with a prism for vertical illumination, or by placing on the stage of the microscope around the specimen, the rim of a deep pillbox from which the bottom has been removed. This simple device shuts off all very oblique light and renders visible wing venation and other characters which are otherwise often very difficult to make out.

One of the most remarkable facts connected with the preservation of the Florissant insects is the apparent fidelity with which colors are usually preserved or indicated. It is not so difficult to understand the preservation of metallic colors which are dependent upon physical structure, but the distinction between red, black, and yellow is usually also retained as well as the difference between hyaline and infuscated wings. This is proven beyond all doubt by the similar color of different specimens belonging to the same species, and the general color tendencies of fossil species as compared with those of recent related forms. In a small proportion of the specimens carbonization has proceeded to the point of blackening the entire specimen but this is unusual. There is probably no doubt that a part of the color differentiation both in recent and fossil insects of these groups is dependent upon the thickness of the chitin covering the different parts of the body, and it is much easier to see how this may have been preserved than to understand the retention of actual pigment colors or their proper representation. The peculiar method of entombment of these fossils must be, I think, in great part responsible for this. The volcanic ash of which the matrix was formed, was evidently very fine, and its similarity to cement rock has led me to believe that the rapidity with which it originally hardened must have been very great. This would account in great measure for the failure of the chitin to macerate as it will do in the presence of much water, and perhaps also for the presence of pigment. In his *Tertiary Insects* ('90, p. 24) Scudder quotes Dr. M. E. Wadsworth who examined specimens of these insect-bearing shales, to the effect that they probably originated from a moya, or mudflow which was rapidly deposited in the shallow waters of the Florissant lake without any preliminary erosion. That the deposition and hardening of the shales was unusually rapid seems to me undoubted, for in no other way can I account for the presence of

pigmental colors and the preservation of microscopic structures like wing hairs with such wonderful perfection.

The distribution of the Miocene parasitic Hymenoptera among the various groups is very interesting and I have attempted to represent graphically in the accompanying diagram (Plate 1) the comparative abundance of the several families and smaller groups during Recent, Miocene, and Oligocene times. In order to make the diagram more easily understood, the comparative numbers and not the actual ones are shown by the width of the black lines for each period since the numbers of species known vary much in proportion for the three periods.¹

Only one family, the Ichneumonidae, was proportionately more abundant in Miocene times than at present and its abundance was caused entirely by the occurrence of a much larger number of species in two of its subfamilies, the Ophioninae and Pimplinae; the other three subfamilies, Ichneumoninae, Cryptinae, and Tryphoninae were about as well represented then as now. The Braconidae appear to have become less numerous, and I believe the change has been even greater than is shown by the diagram, since fossil Braconidae are usually more poorly preserved than the Ichneumonidae, due probably to their softer bodies and wings. The Evanidae appear to have become less abundant in recent times, but this may possibly be due to the small number of species on which the calculation is based. The Chalcidoidea (exclusive of the Mymaridae which are omitted on account of their disproportionate abundance in amber) seem to be on the ascendent, but the number of species of Proctotrypoidea and Cynipoidea is so small that they do not furnish a satisfactory basis for any deductions of this nature.

I have not been able to find much evidence bearing on the probable relationships of the Florissant fauna from a study of the Parasitic Hymenoptera. This is disappointing, but really to be expected, for the group, with minor exceptions, is very widely distributed at the present time and extremely similar the World over. A few points of interest may however be worthy of review. The occurrence of a fig insect shows a tropical element in the fauna, but only serves to strengthen the evidence offered by the presence of fossil fig leaves in the flora. Australian and South African affinities are suggested by

¹ I have used as a basis for the number of recent species, Cresson's Catalogue of North American Hymenoptera. It is now rather old, but I think the proportion of species to be placed in the several families has not changed materially since the time of its publication.

the occurrence of *Leptobatopsis* and *Ormyrodes* respectively, but these may have no general significance, and I do not believe that they have. The abundance of *Ophioninae* and *Pimplinae*, particularly of the former, would appear to be expressions of Neotropical tendencies, and I think they may quite probably be so.

The exact relationships of the present fauna of the United States and of that of Florissant during Miocene times can be traced in the accompanying table. The number of fossil species are contrasted with the number of recent species occurring in the United States (according to Cresson, 1888) and the third column of figures gives the proportionate number of species in the two faunae.

GROUP	Number of recent species in the U. S.	Number of fossil Florissant species	Proportionate number.
Proctotrypoidea	75	5	100:6.6
Cynipoidea	191	3	100:1.5
Chalcidoidea	413	15	100:3.6
Evaniidae	31	2	100:6.4
Ichneumonidae	1326	77	100:5.6
Ichneumoninae	343	13	100:3.8
Cryptinae	280	6	100:2.1
Pimplinae	211	17	100:8.0
Tryphoninae	249	13	100:5.2
Ophioninae	243	28	100:11.5
Alysiidae	40	2	100:5.0
Braconidae	292	19	100:6.5
Stephanidae	4	1	100:25.0

The designation of the special localities for certain of the species collected by Professor Cockerell's expeditions is in accordance with his numbers of stations as given in one of his recent papers (:07). The specimens in the Scudder collection have no indication of which specific localities or beds they were taken from, except that all were taken from the Florissant lake basin.

I wish to gratefully acknowledge the courtesy of the authorities of the Museum of Comparative Zoölogy for the loan of the Scudder collection and the assistance given by Professor Cockerell who first suggested to me the great interest attaching to the Florissant fauna, and who aided by the sending of much material. I am indebted to Dr. H. C. Bumpus and Mr. R. W. Miner of the American Museum

of Natural History for the fine figures of the types belonging to that institution, which they had made as illustrations.¹

The task of working up the material has consumed much more time than I anticipated when I undertook it fully two years ago, due not only to many interruptions, but to the necessarily slow methods of studying and comparing the specimens which belong to a group unusually difficult to classify. For these reasons the work has been very tedious but I hope that future students may not be misled into thinking it uninteresting. On the contrary, it is extremely fascinating.

BETHYLIDAE.

Handlirsch in his recent work (:07) on fossil insects records the presence of a species of this family in Baltic Amber and I have already figured (:06) a strange species from Florissant which most likely is a bethylid.

In the present series there is one very finely preserved species belonging to the genus *Epyris*.

EPYRIS DELETUS, sp. nov. (Fig. 1.)

Female. Length 5.5 mm. Black; the antennae brownish, except at the base, and the abdomen brownish toward the tip. Head (as preserved) but slightly wider than long. Antennae of the typical attenuated form, stout basally and involute, the number of joints not ascertainable; those near the middle quadrate. Surface of head faintly shagreened. Prothorax about one-third longer than the mesonotum, which seen from the side is about as long as the metanotum. The latter carinate laterally, i. e. with a raised margin, its lateral angles rather prominent, quadrate. Abdomen slightly longer than the head and thorax together, seen from the side of the typical form or perhaps slightly more slender or elongate. Legs, except one of the anterior ones not preserved; this is very strongly incrassated, and brownish yellow on the tibia and tarsus. Wings hyaline, with elongate,



FIG. 1.—*Epyris deletus*, sp. nov. Type.

¹ The manuscript of the present paper was completed before the writer severed his connection with the Milwaukee Public Museum, and he wishes to take this opportunity to thank Mr. H. L. Ward, the Director of the Museum, for the interest taken by him in the progress of the work.

narrow, fuscous stigma; two basal cells; marginal cell open, but the radial vein is very long, four or five times as long as the short basal vein; veins, except the costal, pale.

One specimen, No. A3, very nicely preserved in lateral aspect from Professor Cockerell's Station No. 17. Type in the Amer. Mus. Nat. Hist.

This is a very typical bethylid and is perhaps better referred to *Mesitius* than to *Epyris*. As however, Kieffer believes that the American recent species of *Mesitius* which this approaches in the short basal and long radial veins are not generically distinct from *Epyris*, I have placed it here. The scutellar fovea, which is the only character to distinguish the two genera as restricted by Ashmead does not show, and Kieffer restricts *Mesitius* to a group of species with the lateral angles of the metathorax produced, to which the present form certainly does not belong.

CERAPHRONIDAE.

A single species belonging to *Ceraphron* is recorded by Burmeister ('31) as occurring in Baltic Amber.

PROCTOTRYPIDAE.

This group as here restricted is for the first time recorded in the fossil state.

PROCTOTYPES EXHUMATUS, sp. nov. (Fig. 2.)

Female. Length 5.5 mm. Black, the abdomen reddish except at the base and the tip of the terebra, the black extending farther back on the venter



FIG. 2.— *Proctotypes exhumatus*, sp. nov. Portion of wing and profile of abdomen of type.

than on the dorsal surface, although the tips of the second and third segments appear to be blackened above. Antennae 13-jointed, the first flagellar joint

one and one-half times as long as the second; second and the ones immediately following between two and three times as long as thick. Head not thick antero-posteriorly. Metanotum and metapleurae irregularly rugose; the mesonotum without distinct parapsidal furrows. Base of second abdominal segment fluted along the sides; terebra a little shorter than the posterior tibia, the last abdominal segment being much extruded also. Spur of posterior tibia indistinctly preserved. Wings more or less infuscated toward the middle. Costal cell present; veins and stigma dark, marginal cell rather small, shorter than the stigma. This is a typical representative of the genus closely allied to the recent *P. caudatus* Say.

Six specimens.

Type.—No. 2055, M. C. Z., Florissant, Col. (No. 4391, S. H. Scudder Coll.). Other specimens, M. C. Z., Nos. 2056–2059, Nos. 845, 8389, 10894, 8111, S. H. Scudder Coll.); and A 97 from Professor Cockerell, the latter in the Amer. Mus. Nat. Hist.

The specimen from Professor Cockerell was collected by Mr. S. A. Rohwer at Station 13. M. C. Z., No. 2059 (No. 8111 S. H. Scudder Coll.) may not be the same species as the terebra and last abdominal segment are more strongly exerted and apparently longer.

BELYTIDAE.

This family is known fossil only at Florissant so far as I am aware, although some of the earlier references to Proctotrypidae may possibly be based on members of the present group. In addition to *Pantoclis deperdita* Brues (:06), I have the following:

BELYTA MORTUELLA, sp. nov. (Fig. 3.)

Male. Length 2.25 mm. Probably entirely dark colored, black or piceous, perhaps the legs and antennae a little lighter. Antennae as long or somewhat



FIG. 3.—*Belyta mortuella*, sp. nov. Type.

exceeding the body in length, filiform but rather stout, the extreme apex not preserved. Several joints before the middle of the flagellum subequal, each about four times as long as thick, those following to near the tip similar but somewhat shorter. Body shining, the mesonotum with deep and complete parapsidal furrows; metathorax carinated and quite distinctly areolated on the sides. The specimen is seen in

lateral view and the absence or presence of a median carina cannot be made out. Abdomen nearly as long as the head and thorax together, the petiole nearly twice as long as thick, coarsely striated. Second segment very large, covering nearly the entire surface; entirely smooth, following all short, transverse-linear, together only about one-sixth the length of the second. Wings and legs not preserved.

One specimen, A32, collected by Mr. S. A. Rohwer at Station No. 14. Type in the Amer. Mus. Nat. Hist.

This is a typical belytid, not very readily assignable with assurance to any particular genus, and therefore left in *Belyta*, *sensu lato*.

DIAPRIIDAE.

Two genera, one of them new, are represented each by a single species in the present series from Florissant.

PARAMESIUS DEFECTUS, sp. nov. (Fig. 4.)

Female. Length 4-5 mm. Black; antennae at base and legs reddish brown. Antennae probably 13-jointed, gradually clavate, all of the flagellar joints however longer than wide. Thorax oval, rather long, the mesonotum with complete but rather delicate parapsidal furrows. Scutellum with a large, broad transverse median fovea at the base. Metathorax very short, with three longitudinal carinae. Abdomen rather short, twisted at the base in the type so that the petiole is not preserved; broadest just beyond the middle. Wings slightly, but distinctly infuscated; submarginal vein long, two-thirds the length of the wing, stigmated. Basal vein obsolete. Legs long and slender.

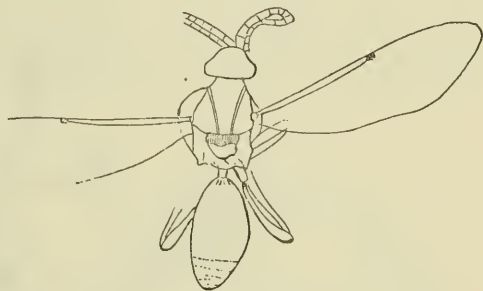


FIG. 4.—*Paramesius defectus*, sp. nov. Type.

One specimen.

Type.—No. 2061, M. C. Z., Florissant, Col. (No. 13,394, S. H. Scudder Coll.). The specimen is not well preserved, but undoubtedly is a member of this genus or of a very closely related one. The head of the type is peculiarly constricted, but I think this is undoubtedly due to the pressure of the matrix.

GALESIMORPHA, gen. nov.

Head produced as in *Galesus*, elongate. Wings with a submarginal vein distinct from the margin, ending in a stigma at one-half the length of the wing. Basal vein very distinct.

Type.—*G. wheeleri*, sp. nov.

This is very much like *Galesus* to which it appears to be more closely related than to any other genus so far described, but differs by its distinctly veined wings.

GALESIMORPHA WHEELERI, sp. nov. (Fig. 5.)

Female. Length 3.3 mm. Black, with the legs and antennae brownish. Head longer than wide when seen from above, the ledge above the antennae emarginate on each side of the middle which is produced as a tooth; just at



FIG. 5.— *Galesimorpha wheeleri*, sp. nov. Type.

the middle the head is strongly constricted. Mesonotum shining, convex, with two strong, complete parapsidal furrows distinctly convergent behind. Scutellum large, with a large fovea on each side at the middle, the two con-

nected by an impressed arcuate line which bows forward nearly to the base of the scutellum. Postscutellum with a pair of median foveae basally, a posterior impressed line and an oblique impressed line. Metathorax short, smooth, with three longitudinal carinae, the median one not furcate. Abdomen as long as the head and thorax together, rather slender; petiole one-third as long as the abdomen, longitudinally fluted. Second segment three times as long as the following together, less than one-half as broad as long and coarsely striated at its extreme base. Wings faintly infuscated; submarginal vein about one-half as long as the wing. Legs long and slender, clavate.

One specimen, beautifully preserved, No. A52, collected at Station 13 by Prof. W. M. Wheeler. Type in the Amer. Mus. Nat. Hist. In general appearance it is very much like a true *Galesus*.

FIGITIDAE.

The single species of this family in the present collection seems to be the first one discovered in the fossil state.

FIGITES SOLUS, sp. nov. (Fig. 6.)

Male. Length 2.7 mm. Probably entirely black, except metathorax, base of abdomen, and the legs which are rufous or dark reddish brown. Antennae dark brown, 13-jointed, slender, the club very slightly thickened, two-jointed, its second joint shorter and narrower than the first. First flagellar joint long, fully twice as long as the second which is equal to the pedicel; following to the club about equal, ovate in form. Thorax seen in latero-dorsal view, enough of the dorsum being visible to show the presence of parapsidal furrows, and the probable absence of a cupuliform shape to the scutellum. Abdomen subsessile, about as long as the head and thorax together, apparently not pubescent at the base, although this character may have been lost in the process of preservation. Legs rather stout for this group. Wings hyaline, the veins pale brown; radial cell apparently about two times as long as wide.



FIG. 6.—*Figites solus*, sp. nov. Type.

One specimen, A60 collected by Mr. S. A. Rohwer at Station 17. Type in the Amer. Mus. Nat. Hist.

Although quite well preserved, I can refer the species to Figites only in the wide sense. The slender antennae seem to exclude it from the Eucoilinae.

CYNIPIDAE.

Cynips has been twice recorded from Amber, first by Schlotheim ('20) and later by Presl ('22). Menge ('56) notes the presence of the family in Amber, and Gravenhorst ('35) mentions Diastrophus (Diplolepis) from the same source.

From Florissant I have representatives of two of the three sub-families recognized by Ashmead, the Cynipinae and the Ibaliinae.

CYNIPINAE.

There are in the collection four species which I take to be true gall-flies, but from lack of personal knowledge, I have left them undescribed. A single specimen, however, which appears to represent a leaf gall, is I think worthy of specific record.

ANDRICUS MYRICAЕ, sp. nov. (Fig. 7.).

Gall regularly elliptic when seen from above, 6 mm. long and 3.5 mm. wide, placed next to the midrib of a leaf of either *Myrica obscura* Lx. or *Myrica drymeja* (Lx.) Knowlton (*M. fallax*), at a point where the leaf is about 13 mm. broad. Curiously enough Lesquereux has figured a leaf of *M. fallax* with gall-like excrescences upon it similar to this one in his Cretaceous and Tertiary Flora ('83, pl. XXXII, fig. 14).

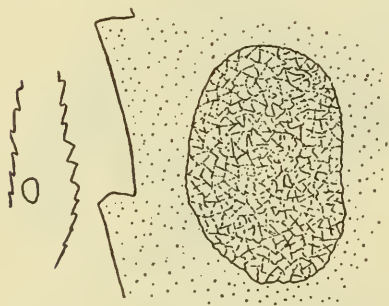


FIG. 7.—*Andricus myricae*, sp. nov.
Type.

One specimen.

Type.—No. 2064, M. C. Z., Florissant, Col. (No. 3812, S. H. Scudder Coll.).

It is of course impossible to be definite regarding the systematic position of a fossil gall, or even to be perfectly sure that the specimen is an insect gall. However, under a magnification of about forty diameters the concentric arrangement of tissue remaining about the periphery of the cicatrix leaves little doubt that the large central ovoid area which has now flaked off the rock

represents an insect gall. Its size and position on the leaf suggest the cynipid *Andricus*. In connection with this it is interesting to note that there are in the collection a few insects which are quite probably referable to the recent genus *Andricus*, most of the living species of which are believed to form galls on various species of *Quercus*. So far as I can ascertain no galls on *Myrica* produced by recent species have been described. We can never hope to associate fossil gall-flies with their habitations in a specific way, and it seems justifiable therefore, to give the present gall a specific name.

IBALIINAE.

PROTOIBALIA, gen. nov.

Head and thorax coarsely sculptured, the abdomen shining, but little longer than the head and thorax together. Ovipositor prominent, at least longer than the abdomen and probably much longer as the tip is not preserved in the type specimen. Antennae of the female filiform, apparently 13-jointed, the apical flagellar joints shorter than the basal ones. Metathorax short, truncate; scutellum unarmed. Abdomen sessile, elongate oval. Legs moderately stout, the posterior femur broad, but nearly as long as its tibia. Hind metatarsus apparently equal in length to the following taken together. Wings with the radial cell much shorter and broader than in *Ibalia*; three submarginal cells, the first large and indistinctly closed below, second very small, third open.

A most remarkable genus which combines characters of *Ibalia* and certain true cynipines. In habitus it is somewhat suggestive of *Leucospis*, in fact after a preliminary examination of the reverse which does not show the wing, I had labeled it "related to *Leucospis*?"

Type.— *P. connexiva*, sp. nov.

PROTOIBALIA CONNEXIVA, sp. nov. (Fig. 8.)

Female. Length 5 mm. Yellow, varied with black. Antennae brownish, legs basally and the posterior pair almost entirely dark; abdomen with the segments dark below and apically. Head rugose punctate; antennae slender, of equal thickness throughout, except for the swollen scape. Pedicel less than one-half as long as the first flagellar joint which is about four times as long as thick; second longer than the first; following growing shorter. Thorax roughly sculptured, the mesonotum transversely rugose; propleurae irregularly so. Metathorax and probably also the scutellum rugose. Abdomen

apparently with five segments of approximately equal length, the first two somewhat shorter. Wings hyaline, the veins brown.



FIG. 8.—*Protoibalia connexiva*, gen. et sp. nov. Type.

Type.—No. 2065, M. C. Z., Florissant, Col. (No. 13,514, S. H. Scudder Coll.). Also the reverse, No. 2066 M. C. Z., Florissant, Col. (No. 13897, S. H. Scudder Coll.).

AGAONIDAE.

The occurrence of what is undoubtedly a true fig insect among the specimens from Florissant is one of the most interesting discoveries which I have made.

The presence of fossil fig trees in the Florissant flora is already known, and the occurrence of a fig insect shows that they were undoubtedly then fertilized through the agency of Agaonidae just as they are at the present day.

TETRAPUS MAYRI, sp. nov. (Fig. 9.)

Female. Length 4 mm. Probably dark colored, although nearly all the color indications are flaked off in the type. Head preserved in lateral view; very long, proclinate, fully twice as long as thick. Antennae apparently 11-jointed, rather stout, the scape short, pedicel small, flagellum not thickened apically, first three joints about quadrate; following also apparently about the same shape, the last probably longer. Thorax above and on the pleurae coarsely sculptured, transversely rugose-striate, merely striate or aciculate on the pleurae anteriorly. Thorax strongly arched above, the metathorax long, with some transverse irregular areas anteriorly. Spiracles very large and

prominent, oval. Abdomen only two-thirds as long as the thorax, seen laterally it is suddenly truncate apically (the tip missing?). Ovipositor exerted, but broken away near the base in the type. Anterior and posterior legs very strong and swollen, their coxae large, triquetrous. Middle legs small or wanting, at least not indicated in the specimen, although the anterior and posterior pairs are very well preserved and quite prominent. Wings hyaline, venation not distinguishable.

Described from one specimen.

Type.— No. 2067, M. C. Z., Florissant, Col. (No. 13,976, S. H. Scudder Coll.). It is not very well preserved in certain parts, but most interesting as the



FIG. 9.— *Tetrapus mayri*, sp. nov. Type.

only known fossil belonging to the group of fig insects. It is also a representative of a family at present confined to the tropical and semitropical regions of both hemispheres, and thus shows a distinct southern element in the Florissant insect fauna.

The genus *Tetrapus* Mayr to which I have referred it occurs at the present time in Brazil where it is represented by a single species, *T. americanus*, described by the late Dr. Gustav Mayr, a well-known authority on fig insects in whose memory I take a very great pleasure in dedicating the fossil form.

TOYRMIDAE.

The presence of a species of *Torymus* in the Middle Oligocene of Brunstatt in Alsatia has been noted by Förster ('91), but no other fossil members of this family have been previously made known. The Florissant material contains three genera, one of them new, representing in all six species.

TORYMUS SACKENI, sp. nov. (Fig. 10.)

Female. Length 9 mm. Ovipositor nearly as long as the body. Stout, robust, black, the abdomen brownish or reddish yellow. Head finely striated,

obliquely so on the lower part, and vertically so above. Entire upper side of thorax and scutellum closely and finely transversely aciculate, the aciculations arranged in coarse transverse rugae. Abdomen elliptic, broad when

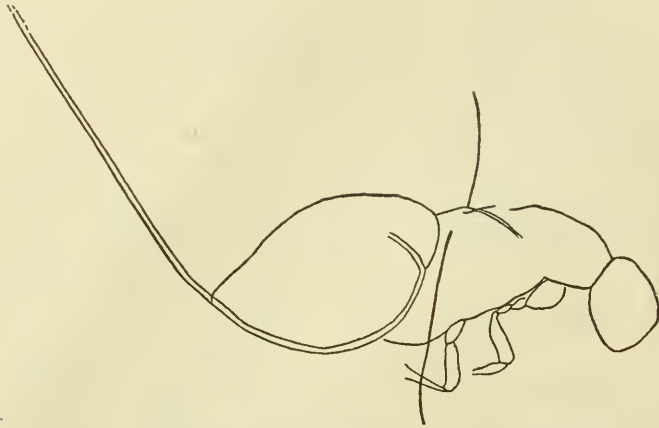


FIG. 10.—*Torymus sackenii*, sp. nov. Type.

seen in lateral aspect. Ovipositor stout, curving upward, issuing from the tip of the abdomen, but visible as an impression in the specimen to the base of the abdomen where it curves upward to the middle of the basal part of the abdomen. Wings and legs not preserved.

Type.—No. 2068, M. C. Z., Florissant, Col. (No. 12,869, S. H. Scudder Coll.).

This may be a *Palaeotorymus* but its large size and stout habitus recall so strongly the North American *T. magnificus* O. S. that I have ventured in the absence of the wing to place it in the recent genus.

PALAEOTORYMUS, gen. nov.

General habitus like that of *Torymus* and its allies, but easily distinguishable by the immensely elongated postmarginal vein which extends nearly to the apex of the wing. In recent *Torymidae* the postmarginal vein is generally distinctly developed, but in no case does it approach this extraordinary length.

Type.—*P. typicus*, sp. nov.

Key to the Florissant species of Palaeotorymus.

- | | |
|---|-----------------------------|
| 1. Thorax transversely aciculated | 2. |
| Thorax smooth, anteriorly more or less distinctly transversely rugulose | <i>P. laevis</i> , sp. nov. |

2. Sculpture of thorax fine and delicate 3.
Sculpture of thorax coarse *P. striatus*, sp. nov.
3. Marginal vein short, only twice as long as the stigmal.
P. aciculatus, sp. nov.
4. Marginal vein long, much more than twice as long as the stigmal.
P. typicus, sp. nov.

PALAEOTORYMUS TYPICUS, sp. nov. (Fig. 11.)

Female. Length 3–5.5 mm. Color black, the abdomen fuscous. Probably in life the color was metallic green with a yellowish brown abdomen. Wings hyaline, the veins fuscous. Antennae dark colored, the joints toward the middle of the flagellum a little longer than wide, becoming transverse nearer the apex; they are thickest at about the sixth flagellar joint. Head behind rather finely vertically striate or aciculate; thoracic dorsum also finely transversely striate, the striations extending down over the greater part of the pleurae. Metathorax and metapleurae smooth. Legs rather slender; the tibiae and tarsi light colored, except the base of the hind tibiae. Hind coxae outwardly transversely striate. Abdomen about as long as the head and thorax together, flat below and convex above, its surface smooth and polished. Ovipositor a little longer than the abdomen. Marginal vein long, stigmal knobbed, with a distinct pedicel, oblique; postmarginal very long, extending well toward the apex of the wing, or at least indicated by a dark streak resembling a vein that is very distinct.

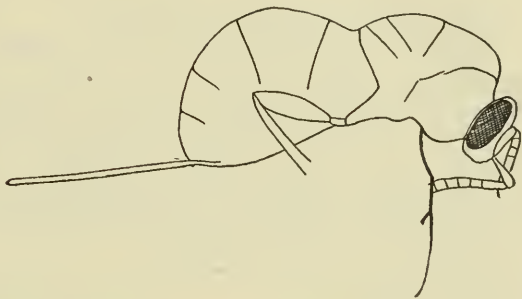


FIG. 11.—*Palaeotorymus typicus*, sp. nov.
Type.

Type.— No. 2072 M. C. Z., Florissant, Col. (No. 610, S. H. Scudder Coll.). Described from fourteen specimens, all in the Collection of the M. C. Z., Nos. 2072–2082, 2195–2198, S. H. Scudder collection, Nos. 610, 997, 2145, 4873, 4511, 4891, 5511, 6164, 6250, reverse of 6164, 7395, 8358, 8917, 10,032, 10,884, 13,354).

The long postmarginal vein of this species is remarkable and is shared also by the following species. There seems to be no doubt, however, that they are close relatives of recent Toryminae in spite of the peculiar development of this vein, and the long stigmal vein which resembles that of the Idarninae.

PALAEOTORYMUS LAEVIS, sp. nov.

Female. Length 4-5 mm. Body shining and rather stout, with the abdomen probably as dark in color as the head and thorax. Surface of head almost smooth. Antennae stout, the flagellum of almost even thickness, slightly stouter near the center where the joints are distinctly wider than long. Thorax smooth except for a sparse coarse rugoso-punctate sculpture on the prothorax, anterior part of mesonotum and the anterior part of the pleurae. The thoracic sutures are deep and slightly crenulate. Abdomen stout, probably considerably compressed, its surface smooth. Ovipositor not entirely preserved, but more than half as long as the abdomen. Posterior coxae weakly and irregularly punctate-striate above; legs slender. Wings with a rather short marginal vein, the stigmal well developed and knobbed, one-third the length of the marginal. Postmarginal vein at least one and one-half times as long as the stigmal and probably longer, but its tip is obscured.

Described from one specimen.

Type.—No. 2083, M. C. Z., Florissant, Col. (No. 9655, S. H. Scudder Coll.).

This is quite similar to the preceding, but the thorax is smooth except for some rough sculpture anteriorly. A second specimen, later sent by Professor Cockerell collected at Station 17B appears to belong to the same species.

PALAEOTORYMUS STRIATUS, sp. nov.

Female. Length 5 mm. Dark colored, probably metallic green, including the entire legs. Head poorly preserved, its surface finely aciculate or shagreened; median joints of antennal flagellum distinctly wider than long. Entire thorax coarsely sculptured; prothorax transversely striate; mesonotum irregularly transversely punctato-striate, the striae curving posteriorly as they extend down on to the upper part of the pleurae. Mesopleura deeply confluent punctate. Metathorax obscured, but apparently smooth with a few coarse reticulations. Abdomen short, ovate in lateral view. Ovipositor exposed only at the base, but I think it can be seen as a trace through the stone for a distance greater than the length of the abdomen. Legs very stout, but this may be due in part to pressure. Wings strong, the veins piceous. Stigmal vein long, knobbed; two-fifths as long as the marginal; postmarginal stout for a distance twice the length of the stigmal, then continued less distinctly nearly to the wing tip.

One very well preserved specimen.

Type.—No. 2084, M. C. Z., Florissant, Col. (No. 10,315, S. H. Scudder Coll.).

A deeply colored, stout species, the thorax much more strongly sculptured than in the two preceding ones.

PALAEOTORYMUS ACICULATUS, sp. nov. (Fig. 12.)

Female. Length 4 mm. Probably entirely metallic green, although there are traces of ferruginous or brown on the abdomen. Thorax finely sculptured. Head behind vertically aciculate on the sides and transversely so on the occiput. Pro- and mesonotum very finely transversely aciculated. Pleurae also coarsely aciculated, but not regularly so except in patches. Base of metathorax on the sides longitudinally aciculated, the remainder of the metathorax irregularly coarsely sculptured. Ovipositor extruded, preserved for only a short distance.

Wings hyaline, the veins brown. Marginal vein short, not more than one-half the length of the submarginal, the stigmal more than half as long as the marginal, and but indistinctly knobbed. Postmarginal long as usual in the genus.

Type.—No. 2085 M. C. Z., Florissant, Col. (No. 2065, S. H. Scudder Coll.).

This species resembles *P. typicus*, but differs by its much shorter marginal vein as well as in thoracic sculpture. Unfortunately the tip of the ovipositor has been scraped away in cleaning the specimen.



FIG. 12.—*Palaeotorymus aciculatus*, sp. nov. Type.

ORMYRODES PETREFACTUS, sp. nov. (Fig. 13.)

Female. Length more than 11 mm. Black, slender, tapering, the abdomen two and one-half times as long as the head and thorax together. Head large,

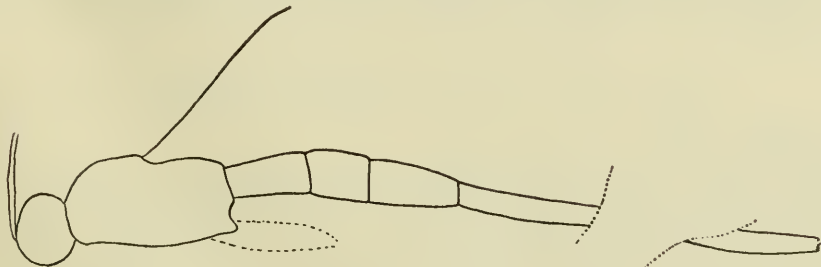


FIG. 13.—*Ormyrodes petrefactus*, sp. nov. Type.

appearing more or less globose. Thorax long, oval, nearly three times as

long as high; its surface sculpture not well preserved. Hind coxae projecting in a raised line above. Antennae poorly preserved, long, reaching nearly to the base of the wings. Metathorax transversely rugose, as long as the mesonotum and nearly two times as long as the prothorax which is contracted in front. Abdomen long and tapering, inserted well up toward the top of the metathorax on its posterior slope, but I think this is due to a slight twisting of the body out of its lateral position. Basal segment as long, but not quite as wide as the second and somewhat narrowed basally; third narrower, and longer, tapering to the tip; the remainder of the abdomen strongly produced into a stylus-like tip which is at least one and one-half times as long as the three basal segments and probably longer as the apex is not preserved. Legs slender; brown, except the posterior coxae. Wings hyaline, not well preserved, but apparently with a long marginal and minute stigmal vein.

Described from one specimen.

Type.—No. 2086, M. C. Z., Florissant, Col. (No. 5657, S. H. Scudder Coll.).

This is one of the most remarkable chalcids I have ever seen. Unfortunately the parts are poorly preserved although the specimen is very sharp and distinct when viewed without magnification. However I feel well assured of its position here on account of its close similarity both in size and habitus to the recent genus *Ormyrodes* Brues of which only a single recent species, occurring in South Africa, has so far been discovered. In the fossil form the abdomen is even more attenuated. Certain eurytomids like *Macrorileya* and its allies are very similar in form, but I hardly think the present species can belong in that family.

CHALCIDIDAE.

Chalcites debilis Heer probably belongs here, otherwise no fossil forms of this family are known, except from Florissant. Professor Cockerell has already published a description of one species of *Chalcis* to which I have two others to add and also one *Spilochalcis*.

Key to the Florissant species of Chalcis.

- | | |
|---|---------------------------------|
| 1. Wings hyaline | 2. |
| Wings with a broad brownish band, abdomen two and one-half or three times as long as wide | <i>C. praevalens</i> Cockerell. |
| 2. Scapulae, pronotum, and sides of mesonotum distinctly transversely striate in sculpture | <i>C. tortilis</i> , sp. nov. |
| Entire thorax irregularly coarsely punctate, only the anterior half of the sides of the mesonotum with traces of striate sculpture. | |
| | <i>C. perdita</i> , sp. nov. |

CHALCIS PRAEVALENS Cockerell.

There are two specimens of this species in the present collection M. C. Z., No. 2087, 2088 (Nos. 5279, 7939, S. H. Scudder Coll.).

CHALCIS TORTILIS, sp. nov. (Fig. 14.)

Length 4.5–7 mm. Head and thorax very coarsely and deeply separately punctate, the sculpture on the collar less deep, and confluent to form a transverse series of rather regular striations. The parapsides especially toward the sides show the same transverse striation. Punctures on the scutellum larger and better separated than elsewhere. Mesonotum quite regularly reticulate. Abdomen smooth, ovate; narrow, only about two-thirds as wide as the thorax. Head as usual in the genus, probably black; sides of the front obliquely striate. Antennae black; rather slender, the scape about half as long as the flagellum; basal flagellar joints about twice as long as thick. Parapsidal furrows very distinct, twice as far apart in front as behind. Scutellum about as wide as long, regularly rounded behind. Hind femora about twice as long as broad, beset below with rather small teeth, of a size and number very similar to those of the



FIG. 14.—*Chalcis tortilis*, sp. nov.
Type.

recent *C. ovata* Say. Hind tibiae stout, their curve conforming with that of the femur. Wings hyaline or nearly so. Marginal vein one-half the length of the submarginal. Stigmal long, its shaft at least twice as long as the width of the marginal vein at its insertion, knobbed at the apex. Post-marginal about one-half the length of the marginal.

Described from four specimens.

Type.—No. 2089, M. C. Z., Florissant, Col. (No. 1350, S. H. Scudder Coll.). Paratypes Nos. 2090–2092. Nos. 1065, 3538, and 5295, S. H. Scudder collection. In addition to these there is another (No. 2093, M. C. Z., No. 5672 S. H. Scudder Coll.) which is probably a ventral view of this species and also a side view (No. 2094 M. C. Z., No. 7679 S. H. Scudder Coll.) which seems without much doubt to belong here.

CHALCIS PERDITA, sp. nov.

Length 4-7.5 mm. Head and thorax with coarse thimble-like punctures which do not merge into striations on the pro- and mesothorax; the punctures largest on the scutellum and the upper part of the mesonotum. Body presumably dark or black with the tarsi, venter of abdomen, and posterior margins of abdominal segments reddish or rufous. Antennae dark brown, black basally, the joints near the middle of the flagellum wider than long. Scutellum raised anteriorly and sloping back, projecting laterally over the metapleurae. Metanotum rather regularly hexagonally reticulate, its lower hind angles laterally produced. Abdomen as long as the head and thorax, smooth, shaped as in *C. ovata* Say. Posterior femora very broad, almost as wide as long, with about eight moderately large teeth toward the apex, the tibiae evenly arcuated. Wings hyaline, marginal vein about two-thirds the length of the submarginal; stigmal short and oblique, about twice as long as the thickness of the marginal vein, and not or imperceptibly enlarged at the tip.

Described from three specimens.

Type.—No. 2095 M. C. Z., Florissant, Col. (No. 4801, S. H. Scudder Coll.). Paratypes, Nos. 2096-2097, M. C. Z. (Nos. 7817 and 9547, S. H. Scudder Coll.). All are seen nearly in profile in much the same position.

No. A76 and reverse in the collection of the American Museum of Natural History collected by Professor Cockerell at Station 13 appear to be this species, but are seen in dorsal view with the wings not preserved. The punctures on the head above are elliptical and more or less confluent.

SPILOCHALCIS SCUDDERI, sp. nov.

Length 5.5 mm. A specimen seen in ventral aspect, with the head bent down. Inner margins of eyes parallel, the front coarsely punctate, with an oval smooth space centrally which shows microscopic circular aciculations. Antennae 13-jointed, distinctly clavate, the scape a little more than half as long as the flagellum. Joints beyond the middle of the flagellum one-half wider than long. The antennae are inserted just about on an imaginary line drawn between the lower margins of the eyes. Sides of face below obliquely striated, cheeks smooth. Projecting sides of metanotum below irregularly reticulated, the lateral angles angularly produced. Posterior coxae more than half as long as the femora, slender and about twice as long as the abdominal petiole. Posterior femora oval, somewhat less than twice as long as broad. Abdomen rounded at the tip, distinctly longer than the thorax.

Described from one specimen, seen in ventral aspect. The antennae

are inserted much lower than is usual in *Spilochalcis* and its allies and it is barely possible that this insect is really a member of the *Chalcitellini*.

Type.—No. 2098, M. C. Z., Florissant, Col. (No. 9136, S. H. Scudder Coll.).

EURYTOMIDAE.

Decatoma has been recorded by Scudder ('78) from the Oligocene of Green River, Wyoming, but otherwise I can find no palaeontological reference to the group. The present collection contains two species of *Eurytoma*.

EURYTOMA SEPULTA, sp. nov. (Fig. 15.)

Female. Length 4.5 mm. Black or very dark, including legs and antennae; wings hyaline. Antennae apparently 13-jointed, with one ring joint, the last three joints forming a slight, but quite distinct club; funicle joints about quadrate. Surface of head irregularly rugulose. Dorsum of thorax strongly



FIG. 15.—*Eurytoma sepulta*, sp. nov. Type.

transversely rugoso-punctate. Abdomen quite distinctly sessile, ovate in lateral aspect, the last ventral segment acutely prolonged. Wings hyaline, venation fuscous; marginal vein long, about two and one-half times the length of the stigmal. Stigmal weakly divergent from the postmarginal, strongly knobbed; postmarginal much longer than the stigmal, stout.

Described from three specimens, No. A9 (type), A103 both from

Station 14 and No. 2100, M. C. Z., Florissant, Col. (No. 9065, S. H. Scudder coll.).

Type in the Amer. Mus. Nat. Hist.

The arrangement of the large umbilicate punctures on the thorax of this species is more regularly transverse than in recent forms and the antennae more distinctly clavate than in the majority of living species, but otherwise this seems to be quite a typical representative of the group.

EURYTOMA SEQUAX, sp. nov. (Fig. 16.)

Male. Length 3.75 mm. Represented by a poorly preserved specimen, but so characteristic that it is undoubtedly an *Eurytoma* or a *Decatoma*. The body is black, with a small brownish abdomen. The legs, wings, and antennae



FIG. 16.—*Eurytoma sequax*, sp. nov. Type.

are not preserved. One might perhaps associate it with the preceding species, but the large thoracic punctures are less closely placed and show no tendency to assume a transverse arrangement.

No. A120, collected at Station 14. Type in the Amer. Mus. Nat. Hist.

PERILAMPIDAE.

Brischke ('86) has found *Perilampus* in Baltic Amber.

CLEONYMIDAE.

The following species is the first fossil member of the family to be described.

CLEONYMUS SUBMERSUS, sp. nov. (Fig. 17.)

Female. Length 7 mm. Entirely black, with slightly infuscated wings. Head as seen from above rounded in outline, narrower than the thorax which is elongate, two and one-half times as long as wide. Abdomen elongate, conic ovate, its segments, except possibly the basal two, of nearly equal length. Wings very thickly pubescent, with stout dark venation; marginal vein long, one-half the length of the submarginal; stigmal short and stout, thicker at the apex, postmarginal as long as the marginal, but attenuated beyond its basal part.

Type.—No. 2101, M. C. Z., Florissant, Col. (No. 9109, S. H. Scudder Coll.).

This is not a very well preserved specimen, but is striking on account of its large size and acuminate abdomen.



FIG. 17.—*Cleonymus submersus*, sp. nov. *Type*.

PTEROMALIDAE.

Aside from Heer's ('65), doubtful genus *Pteromalinites* Helm ('99) has recorded *Pteromalus* from Amber, but without description or figure. I have one species of *Pteromalus* from Florissant.

PTEROMALUS EXANIMIS, sp. nov. (Fig. 18.)



FIG. 18.—*Pteromalus exanimis*, sp. nov. *Type*.

Female. Length 3–3.5 mm. Black (metallic in life?) with hyaline wings and piceous or brownish abdomen. Propleurae finely transversely rugose, the mesonotum smooth, with a few delicate punctures, indistinctly rugose on the pleurae. Metathorax short, with carinae indicating some areas. Abdomen sessile, ovate, pointed apically; third segment the longest, following gradually shorter, the second a little shorter than the third. Wings pubescent, the marginal vein short and thick; one-sixth, or perhaps less, the length of the submarginal; stigmal broadly divergent, strongly hooked at the

length of the submarginal; stigmal broadly divergent, strongly hooked at the

tip and nearly as long as the marginal. Postmarginal strongly developed, one and two-thirds times as long as the marginal. Ovipositor not or but little exerted.

Two specimens, one of them with reverse. Type and its reverse Nos. A57 and A55 from Station 13; A34 from Station 17, in the Amer. Mus. Nat. Hist.

Although not very well preserved this appears to be a common species and deserving of a name. There are a number of other specimens which are quite probably the same, but such minute fossils are very difficult of specific association. The term *Pteromalus* is used in the wide sense.

MYMARIDAE.

This family is abundantly represented both in Amber and Copal, but has not been found fossil elsewhere. The extremely minute size and fragile character of the species would make their recognition in shales like those of Florissant, very difficult.

The Amber species found are listed on page 111.

EVANIIDAE.

Up to the present time there are two references in palaeontological literature to fossil Evaniidae. Burmeister ('31) records the occurrence of *Evania* in Baltic Amber, and Brischke has later ('86) mentioned a species belonging to one of the closely related genera, quite probably the same genus under the name of *Brachygaster*, from the same source.

In the present material I have discovered two finely preserved species belonging to the Aulacinae, so that of the three subfamilies, Aulacinae, Foeninae, and Evaniinae at present recognized, only the second is unknown in the fossil state.

AULACUS BRADLEYI, sp. nov. (Fig. 19.)

Length probably about 18 mm., the abdomen missing. Entirely dark or black, the legs somewhat lighter beyond the knees. Head seen from the front three-fourths as broad as high, gradually narrowed and rounded below; its surface minutely punctate or shagreened. Antennae inserted close together near the clypeus. Antennae much like those of recent species, the joints of the antennal flagellum beyond the first long and cylindrical. Thorax

typically transversely channeled or ribbed, the parapsidal furrows distinct. Scutellum less coarsely sculptured, transversely rugose. Metanotum rather finely, irregularly reticulated. Abdomen not visible, but its insertion on the dorsal tubercle of the metanotum is indicated, and the abdomen due to its elevated position is no doubt concealed in the matrix. Legs normal so far as preserved, the posterior coxae transversely granulated above. Wings hyaline, with fuscous stigma and veins. Subcostal cell very broad and distinct, but very slightly pigmented. Stigma small, elongate ovate. Radial

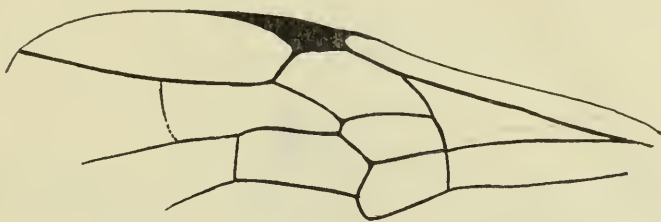


FIG. 19.—*Aulacus bradleyi*, sp. nov. Type.

cell long and of even width on the basal half; the second section of the radius nearly as long as the third and twice the length of the first. First cubital and first discoidal cells nearly equal along the base, the discoidal slightly the higher; first recurrent nervure received by the second cubital cell near its base; only two closed cubital cells, the second very distinctly closed; second recurrent nervure received considerably beyond the middle of the second cubital cell. Median and submedian cells of equal length; subdiscoidal nervure broken slightly below the middle.

One specimen and reverse, Nos. B1 and B2 collected by Mrs. Cockerell at Station 13b during 1908. Named for my friend Mr. J. Chester Bradley in recognition of his extensive studies in this interesting family.

This is a large and beautifully preserved species which resembles typical recent species except that the first recurrent nervure is inserted very distinctly at the base of the second cubital cell instead of being interstitial or received near the tip of the first. However, I hardly think it worthy of generic rank on this single character in the absence of any other preserved ones which I can discover.

PRISTAULACUS ROHWERI, sp. nov. (Fig. 20.)

Female. Length 7 mm. Ovipositor at least two-thirds the length of the abdomen and probably longer. Black or very dark, with the abdomen except the tip much lighter, reddish or brown. Legs apparently light colored. Surface of head finely shagreened, with faint traces of a microscopic transverse

aciculation above; antennae not well preserved in the type, one of the joints (probably the third) very long. Prothorax very strongly and coarsely transversely striate, the ridges between the grooves sharp, well elevated; mesopleurae also coarsely obliquely striate; metanotum more or less distinctly areolated and irregularly rugose. Abdomen inserted at the upper edge of the posterior slope, about as in *P. occidentalis* Cress., but the abdomen appears to be much shorter and stouter than in that species, although this may be due to compression in the stone. The petiole appears to be short, but little longer than the second segment; third to fifth somewhat shorter, subequal. Ovi-

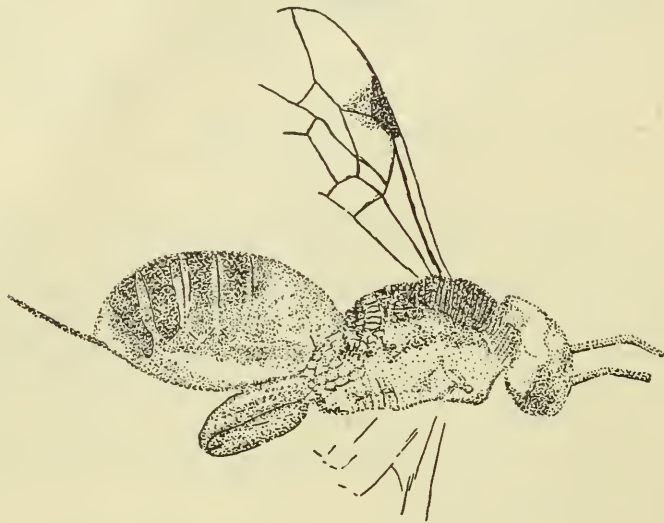


FIG. 20.—*Pristaulacus rohwleri*, sp. nov. Type.

positor visible for about two-thirds the length of the abdomen where its tip is lost in the stone. Wings hyaline except for a very distinct infuscated spot below the stigma. Veins and stigma pale brown; first recurrent nervure received at three-fourths the distance from the base to the apex of the first cubital cell; first discoidal cell very small for this genus, its base scarcely over one-fourth the length of the basal vein, its upper side nearly three times as long as its base along the basal vein; second discoidal very high and short. Second transverse cubitus present, distinct, the second recurrent nervure inserted at the apical one-fourth of the second cubital cell. Marginal cell short, not more than two and one-fourth times as long as wide.

One specimen, collected by Mr. S. A. Rohwer at Station 14; very nicely preserved.

This is a very interesting species which seems to fit tolerably well in this genus. The stigmal spot which is very distinct in both wings recalls at once the recent *P. occidentalis* Cresson which it also resembles in many other characters. However, the first cubital and the marginal

cell are considerably longer, and the discoidal smaller and more elongate. This cell appears to be smaller than in any living species of *Aulacus* or allied genera with which I am familiar and suggests a relationship to *Foenus* (Gasteruption) in which this cell is very small. It would appear therefore that the present form may have been related to some of the transition forms between *Foenus* and the more generalized *Evaniidae*.

ICHNEUMONIDAE.

ICHNEUMONINAE.

Only one species, a *Trogus*, is contained in the collections from Florissant. Heer ('67) has described as *Ichneumonites fusiformis* a species which he thought probably a *Trogus*, but which from its sessile abdomen and long ovipositor is evidently a pimpline.

TROGUS VETUS, sp. nov. (Fig. 21.)

Probably a female. Length about 15 mm. Black, the abdomen pale brown with transverse black bands. Wings hyaline. Rather stout, head large and broadly transverse; antennae preserved only at the extreme base where they are rather slender. Face and front black, with a central pale yellowish brown spot above the insertion of the antennae. Mesonotum smooth or very finely shagreened; scutellum convexly elevated, with a

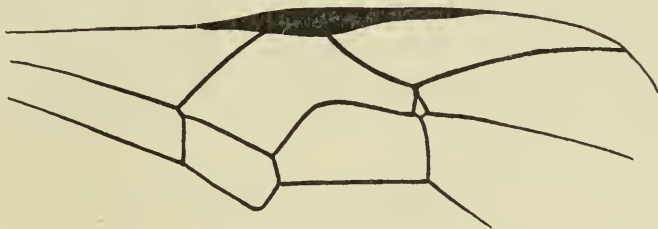


FIG. 21.— *Trogus vetus*, sp. nov. Type.

depression at its base that is margined by a raised line on each side which does not extend to the raised portion. Metanotum partially areolated, there being a single large lateral area on each side separated from the single median one. Abdominal petiole black, the postpetiole margined narrowly behind with dull yellow or pale brown. Postpetiole finely punctate, the extreme tip rugose; second segment pale brown, with a transverse quadrangular black spot medially; third with a much smaller, more nearly round dark spot; fourth with a

similar very small one at its base. Wings hyaline, the veins fuscous or piceous; stigma narrowly lanceolate, dark brown, white at the base. Submedian cell in anterior wing distinctly longer than the median, cubitodiscoidal vein with no stump of a vein; areolet very small, subrhomboidal or nearly triangular, with a long petiole above; receiving the recurrent nervure at its middle. Transverse median vein in hind wing broken at the middle.

Type.— No. 2102, M. C. Z., Florissant, Col. (No. 74, S. H. Scudder Coll.).

One specimen, seen in dorsal view. This has the general habitus of a species of *Ichneumon*, but the ill-defined carinae of the metanotum and the peculiar subrhomboidal areolet in the wing place it rather definitely as a species of *Trogus* or of some closely related genus.

All of the species from Florissant that I have satisfactorily referred to the *Ichneumonini* belong to the genus *Ichneumon*. *Amblyteles* has been found by Schöberlin ('88) in the Upper Miocene of Oeningen.

In addition to these there is a record by Brischke ('86) noting the occurrence of *Ichneumon* in Baltic Amber, and many others referring to the same genus, but most of these are made in such a vague and unsatisfactory way that they can be considered as little more than the use of the term *Ichneumon* to designate any member of the *Ichneumonidae*. The following, however, can be more definitely placed:—

Ichneumon infernalis Heer ('65) on account of its elongate ovipositor is probably a cryptine.

Ichneumon longaevus Heer ('49) is apparently a true *Ichneumon*.

Ichneumon petrinus Scudder ('90) to judge from the excellent figure is a braconid belonging to the *Spathiinae*. The discoidal and first cubital cells are separated only apically according to the description, but the basal part of the cubitus has most likely been lost. The form of the head and thorax particularly are exactly similar to *Hormiopterus* and its allies.

ICHNEUMON Linné.

This genus is represented in the material at hand by ten species, many of them referable with some certainty to some of the subgenera established for recent forms of this very extensive group. One peculiarity exhibited by a number of the fossil species is the shortening of the upper or radial side of the areolet. This gives the wing a peculiar appearance, but is I think of secondary importance as these species agree otherwise with genuine species of *Ichneumon*.

Key to the Florissant species of Ichneumon.

1. Small, 6 mm. in length; areola of metanotum very small, nearly semicircular; antennae slender, all the joints much longer than wide; wings hyaline *I. alpha*, sp. nov.
Larger species, 8–15 mm. in length 2.
2. Wings hyaline, *i. e.* not or scarcely darker than the stone . . 3.
Wings infuscated, much darker in color than the stone . . 8.
3. Very large, 19–21 mm. in length *I. pollens*, sp. nov.
Small or moderate in size, less than 15 mm. 4.
4. Second section of the radius nearly three times as long as the first (70 : 25) *I. obduratus*, sp. nov.
Second section of the radius approximately twice as long as the first *I. primigenius*, sp. nov.
Second section of the radius one-half longer than the first 5.
5. Discocubital vein with a stump of a vein near its centre . . 6.
Discocubital vein simple, without any trace of a stump of a vein. *I. decrepitus*, sp. nov.
6. Slender species, basal joints of antennal flagellum four or five times as long as thick 7.
Stout species; basal flagellar joints not more than three times as long as thick; abdomen not conspicuously banded. *I. exesus*, sp. nov.
7. Areolet large, regularly pentangular . . . *I. torpefactus*, sp. nov.
Arolet moderate, its radial side much shortened *I. provectus*, sp. nov.
Arolet small, regularly pentangular *I. cannoni* Cockerell, sp. nov.
8. Large species, 15–18 mm. *I. dormitans*, sp. nov.
Smaller species, 12 mm. or less 9.
9. Discocubital vein evenly curved; wings fulvous, body in part light colored *I. concretus*, sp. nov.
Discocubital vein with trace of a stump of a vein; wings blackish, body dark colored *I. somniatus*, sp. nov.

ICHNEUMON ALPHA, sp. nov.

Probably a male. Length 6.5 mm. Uniformly black or dark, the antennae and part of the legs brown or fuscous. Wings hyaline. Head smooth or microscopically sculptured, its surface opaque, strongly transverse in general shape. Mesonotum subopaque, the parapsidal furrows rather distinctly marked anteriorly by a line of punctate depressions. Scutellum very slightly convex, with a crenulate transverse groove at its base and raised lateral

margins. Metathorax fully areolated; areola of metanotum very small and almost semicircular; basal and middle lateral areas complete and separated. Abdomen subopaque, the sculpture of the postpetiole so delicate as to be scarcely visible in the specimen. Abdomen rather short and broad, sharply narrowed on its apical portion. Legs scarcely preserved, the hind femora black and the tibiae of the hind legs dark basally with lighter apex and brown tarsi which are weakly annulated with paler. Antennae long and slender, flagellar joints two to four fully twice as long as thick; apical joints shorter, but still longer than thick. Wings hyaline, the veins pale fuscous. Submedian cell in front wings considerably longer than the median, the transverse median nervure very oblique; discocubital vein evenly curved and without a stump of a vein; areolet very narrow above, its side on the radial vein being very short. Marginal cell long, the second section of the radius three times as long as the first.

Type.—No. 2103, M. C. Z., Florissant, Col. (No. 10,955, S. H. Scudder Coll.).

This is a small species which seems to be referable to Thomson's subgenus *Barichneumon*, particularly on account of the configuration of the metanotal areolae and comparatively stout antennae.



ICHNEUMON POLLENS, sp. nov. (Fig. 22.)

Length 19–21 mm. Large and robust, dark colored, with the abdomen apparently more brownish and more or less distinctly banded with black on the basal segment anteriorly. Wings slightly infuscated. Antennae short and stout, strongly narrowed apically and involute, the basal joints from one to one and one-half times as long as thick. Head thick, globular when



FIG. 22.—*Ichneumon pollens*, sp. nov. Type.

seen from above and probably rather short behind the eyes. Scutellum with the usual laterally keeled depression at the base and with the convex posterior part apparently divided into three parts by two longitudinal impressed lines. Metathorax with very large basal areola and apparently completely areolated on the sides. Abdomen rather slender, the petiole not broadly dilated at the apex; sculpture of the postpetiole indistinguishable. Legs stout. Wings normal, the areolet large and regularly pentangular. Cubitodiscoidal cell very long, almost three times as long diagonally as the length of the basal nervure.

Described from three specimens and one reverse.

Type.—No. 2104–2105, M. C. Z., Florissant, Col. (No. 13850, reverse No. 14,052, S. H. Scudder Coll. Paratypes Nos. 2106–2107, M. C. Z., (Nos. 6452 and 11,952, S. H. Scudder Coll.).

Two of the specimens are finely preserved, showing the dorsal view of the body, antennae, part of legs, and most of both pairs of wings. It is a very large species and probably belongs to the subgenus *Stenichneumon* Thomson, to judge from its robust build and thickset, tapering antennae with short joints. The cubito-discoidal cell appears to be somewhat longer in the type specimen, but I think all are undoubtedly the same species. The discocubital vein is without trace of the stump of a vein which is present more or less distinctly in all recent species.

ICHNEUMON OBDURATUS, sp. nov. (Fig. 23.)

Female. Length about 8 mm. Black, legs varied with rufous or ferruginous. Head rather small, more or less subquadrate, its surface subshining. Antennae involute, the basal joints about twice as long as thick and the apical ones more or less quadrate; flagellum apparently without pale annulus. Mesonotum microscopically sculptured, subopaque; parapsidal furrows not defined. Scutellum with a broad transverse depression at its base; its surface moderately convex and with scarcely evident raised lateral margins. Areola of metanotum large, hexagonal, the basal and middle lateral areas separated. Abdomen black, the postpetiole distinctly punctate. Legs rufous or ferruginous, including the coxae. Wings hyaline, veins fuscous, the submedian cell considerably longer than the median, the transverse median vein but little oblique. Discocubital vein evenly and strongly curved, without trace of any stump of a vein. Areolet of moderate size, very narrow above; stigma narrow, black with pale base; marginal cell long, the second section of the radius two and one-half times as long as the first.

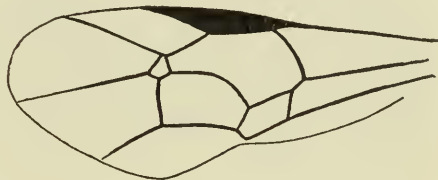


FIG. 23.—*Ichneumon obduratus*, sp. nov. Type.

Described from one specimen.

Type.—No. 2108, M. C. Z., Florissant, Col. (No. 6691, S. H. Scudder Coll.).

ICHNEUMON PRIMIGENIUS, sp. nov. (Fig. 24.)

Female. Length about 12–13 mm. Body dark, but considerably tinged with brown, especially the thorax and the apical portion of the abdomen.

Legs dark brownish; wings hyaline. Antennae rather long, moderately stout, the basal joints of the flagellum three or four times as long as thick; those near the apex becoming about quadrate; the flagellum apparently not annulated. Mesonotum microscopically punctured; basal and middle lateral areas of metanotum distinctly separated. Postpetiole very finely rugulose or

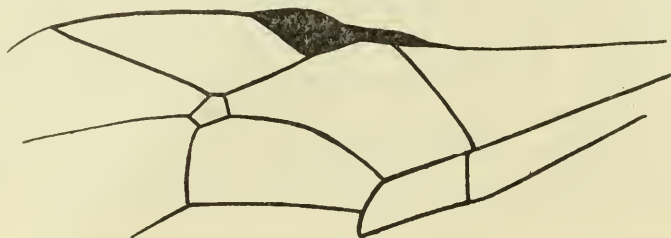


FIG. 24.—*Ichneumon primigenius*, sp. nov. Type.

shagreened, subopaque. Wings hyaline, the veins fuscous; marginal cell wide, the first section of the radius being nearly one-half as long as the second. Areolet slightly oblique, large and pentangular, its upper side quite long. Discocubital vein evenly curved and without a trace of a stump of a vein. Stigma rather broad, ovate-lanceolate, fuscous; submedian cell in front wings equal in length to the median.

Described from one specimen, although there is also a second No. 2110, M. C. Z., Florissant, Col. (No. 2787, S. H. Scudder Coll.) which is doubtfully the same.

Type.—No. 2109, M. C. Z., Florissant, Col. (No. 1680, S. H. Scudder Coll.).

ICHNEUMON DECREPITUS, sp. nov.

Female. Length about 9 mm. Black, the wings hyaline; abdomen with narrow lighter bands on the apices of the segments. Head very strongly transverse; antennae stout, the basal flagellar joints being two times as long as thick and the apical joints transverse. Scutellum rather strongly convex medially and furnished with a broad transverse depression medially which is not margined laterally. Metathorax areolated, but the areas not well preserved in the specimen. Petiole of abdomen strongly dilated and wide at the apex, the postpetiole microscopically sculptured and subopaque; second to fifth segments broad; each with a narrow reddish band along the posterior margin. Legs black, varied with brown on the anterior and middle pairs. Wings hyaline, with the slightest trace of infuscation; stigma and veins dark fuscous. Marginal cell long, but with the first section of the radius fully two-thirds as long as the second. Stigma ovate. Areolet large, pentangular, its upper side long. Discocubital vein evenly curved and without trace of a stump of a vein; submedian cell slightly longer than the median.

Type.—No. 2111, M. C. Z., Florissant, Col. (No. 2085, S. H. Scudder Coll.).

This is a stout, robust species.

ICHNEUMON EXESUS, sp. nov. (Fig. 25.)

Female. Length 13 mm. Yellowish; the head, parts of the thorax and bands on the abdomen black. Head probably entirely black; the antennae brownish yellow, darker basally. Basal joints of flagellum three or four times as long as thick; the apical ones becoming transverse, twice as wide as long; the antennae being moderately stout. Scutellum rather strongly transversely elevated, with a depression at its base which is margined by carinae laterally. Metanotum with the median areola large and quadrate; basal and middle lateral ones separated. Abdomen stout, the petiole narrow and rather strongly elevated apically, the postpetiole being also narrow. Legs brownish yellow, the posterior femora darker, and the tips of the tibiae and tarsi blackish. Wings hyaline, stigma and veins dark fuscous; the former narrow, whitish at the base. Marginal cell wider than in the preceding species, the second section of the radius only one-third longer than the first. Areolet large, obliquely pentangular, the upper side the shortest; discocubital vein not curved, broken at the middle by a short stump of a vein; submedian cell no longer than the median.



FIG. 25.—*Ichneumon exesus*, sp. nov. Type.

Described from one specimen and reverse.

Type.—Nos. 2112–2113, M. C. Z., Florissant, Col. (Nos. 8436 and 9126 (reverse) S. H. Scudder Coll.).

ICHNEUMON TORPEFACTUS, sp. nov. (Fig. 26.)

Female. Length 10 mm. Dark colored, wings hyaline, the abdomen conspicuously banded. Head strongly transverse; the antennae slender, with a pale annulus at the middle. First flagellar joint four times as long as thick; second and third equal, each three-fourths as long as the first and three times as long as thick; joints beyond the annulus strongly transverse. Thorax nearly smooth; scutellum large and very weakly convex. Metathorax with a large hexagonal median areola; the basal and middle lateral areas separated. Abdominal petiole black, slender, the postpetiole very finely sculptured or scabrous. Body of abdomen dark brown or piceous with a very distinct pale cross band on each segment anteriorly. Wings hyaline,

the veins and stigma fuscous, the latter narrowly oval or lanceolate. Marginal cell long and narrow; the first section of the radius two-thirds as long as the second. Areolet large and regularly pentangular. Submedian cell slightly longer than the median. Legs yellowish, the posterior coxae and trochanters black.

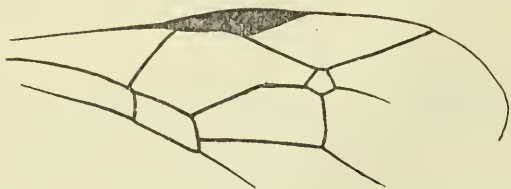


FIG. 26.—*Ichneumon torpefactus*, sp. nov.
Type.

Type.—Nos. 2114–2115, M. C. Z., Florissant, Col. (Nos. 7572 and 7364 (reverse) S. H. Scudder Coll.).

Described from three specimens, the type and Nos.

2116–2117, Fig. 26, M. C. Z., Florissant, Col., Nos. 4587 and 4294, S. H. Scudder Coll.) which are undoubtedly the same species. There is also a fourth No. 2118, M. C. Z., Florissant, Col. (No. 13,915, S. H. Scudder Coll.) which is doubtfully referable to this species.

This is a slender species, agreeing with the subgenus *Melanichneumon* in most respects although the postpetiole does not appear to be punctate.

ICHNEUMON PROVECTUS, sp. nov. (Fig. 27.)

Female. Length 8 mm. Black or dark colored, the abdomen considerably lighter on the apical half and along the sutures between the segments. Antennae slender, the basal joints of the flagellum elongate, the first to fifth each at least two and one-fourth times as long as thick, the first being about four and the second three times as long as thick; joints toward the apex becoming broader and short, quite distinctly transverse. Surface of head minutely punctulate above as is also the mesonotum; posterior part of head and pleurae smooth. Metanotum completely areolated, although it is possible that the basal and middle lateral areas may be confluent. Abdomen elongate, slender; postpetiole smooth or nearly so. Ovipositor rather strongly exerted. Legs moderately stout, the hind pair brownish, with the tibiae paler, the tips of the latter and the tarsi black. Wings hyaline, with pale fuscous veins; first section of the radius fully two-thirds the length of the second; areolet rather small, its upper side shortened until it is quite irregular in shape; dis-



FIG. 27.—*Ichneumon provectus*, sp. nov. Type.

cocubital cell with a rather long stump of a vein at its middle; submedian cell a trifle longer than the median.

One specimen.

Type.—No. 2119, M. C. Z., Florissant, Col. (No. 2879, S. H. Scudder Coll.).

ICHNEUMON CANNONI, Cockerell sp. nov.

"Length 12 mm. or slightly over; anterior wing about 8.75 mm.; wings clear, nervures and stigma black or dark brown; head and thorax black, scutellum not pallid; abdomen brown, shaped as is usual in the genus, with broad pallid sutural bands, which (at least the first two) broaden medially, making a large rather diamond-shaped mark; no protruding ovipositor; antennae stout, strongly curled, ordinary, dark brown or black, with the middle of the flagellum broadly pallid (? an accident of preservation), width of flagellum 290 micra; legs ferruginous; venation normal; origin of basal nervure a little to the basal side of the transversomedial; transversomedial a little oblique, but outer side of second discoidal cell much more so; basal nervure distinctly curved; areolet small. Wing measurements in micra; depth of stigma 340; depth of marginal cell 680; stigma on marginal cell 646; length of marginal cell 2210; length of areolet 323; length of basal nervure (not allowing for curve) 935; length of transversomedial (not allowing for slight curve) 408; origin of basal nervure to origin of first recurrent 901."

"Florissant, in the Miocene shales. In the collection at the Capitol Building at Denver, in the custody of the State Historical and Natural History Society; collector unknown. Named after Mr. Cannon of Denver, in recognition of his palaeontological researches in Colorado" (T. D. A. Cockerell MS. March 5, 1908.)

ICHNEUMON DORMITANS, sp. nov.

Sex? Length about 17 mm. Black or dark brown, the abdomen ferruginous. Wings distinctly infuscated. Head rather large, antennae not preserved. Metathorax areolated, although the areas are not preserved well enough to make out clearly. Abdomen ferruginous, the petiole darker or black. The sutures are constricted somewhat giving the abdomen an appearance similar to that of the genus *Trogomorpha*, but I believe this is due principally to the fossilization. Legs but little preserved, but apparently dark ferruginous in color, wings distinctly infuscated; areolet obliquely pentangular, rather large. Marginal cell long, the first section of the radius considerably more than half as long as the second; insertion of transverse median vein not discernible; discocubital vein without a stump of a vein, evenly curved.

Described from one specimen.

Type.—No. 2120, M. C. Z., Florissant, Col. (No. 7992, S. H. Scudder Coll.).

ICHNEUMON CONCRETUS, sp. nov.

Female. Length 11 mm. Head and thorax principally black; abdomen principally pale rufous or ferruginous; legs black, varied with reddish; wings fulvous. Head black, antennae fuscous, the basal flagellar joints but little longer than wide, the tips of the antennae not preserved. Thorax black, more or less reddish on the metathorax. Metathorax distinctly areolated, the median areola large, to judge from the side view nearly quadrate; basal and middle lateral areas not separated. Abdomen reddish brown, the petiole very dark and the other segments stained more or less above. Abdomen considerably swollen toward the tip. Legs reddish, the femora of the four posterior legs and the apical part of their tibiae, especially those of the middle legs, black or piceous. Wings fulvous, the stigma and veins nearly concolorous; areolet large, obliquely pentangular, the upper side being short. Marginal cell narrow, the second section of the radius two and one-half times as long as the first; discocubital vein evenly curved; median and submedian cells of equal length.

Type.—No. 2121, M. C. Z., Florissant, Col. (No. 10,050, S. H. Scudder Coll.).

ICHNEUMON SOMNIATUS, sp. nov.

Female. Length 8 mm. Rather slender; black, the legs and abdomen more or less reddish brown. Head small, antennae stout, black basally and reddish brown toward the apex, the flagellum annulate with white; basal flagellar joints long, fully four times as long as thick; the apical ones much shortened, quadrate or slightly transverse. Thorax black. Areola of metathorax not visible in the specimen, the basal and middle lateral areas separated. Abdomen black, brownish beyond the third segment; postpetiole smooth, or at least not exhibiting any noticeable sculpture. Middle and hind legs dark, the anterior pair and all the tarsi brownish. Wings slightly, but distinctly infuscated; veins and stigma dark fuscous. Marginal cell rather broad, the second section of the radius nearly twice as long as the first. Areolet rather large, quite regularly pentangular. Discocubital vein angularly bent and furnished with the barest trace of a stump of a vein at the fracture. Median and submedian cells of nearly equal length.

Type.—No. 2122, M. C. Z., Florissant, Col. (No. 3014, S. H. Scudder coll.).

CRYPTINAE.

This part of the Ichneumonidae is more poorly represented than any of the other subfamilies, only three genera, Phygadeuon, Hemiteles, and Cryptus appearing in the present collection. In a previous paper ('06) I have described a species of Mesostenus from Florissant, and there are numerous records of the group from European deposits.

Brischke ('86) mentions the presence of Pezomachus in Baltic Amber, and there are in the Scudder collection now before me a couple of specimens which are possibly males of this genus.

Ichneumonites bellus, Heer ('67) is probably a cryptine. Heer has also described an Hemiteles from Radoboj and Brischke includes this genus in his list of Amber Hymenoptera ('86).

Cryptus has presumably been found a number of times, but all records except those of Gravenhorst ('35) and Brischke ('86) on Amber fauna are rather doubtful, even Heer's *C. antiquus* ('49) to judge from his figure which shows an insect with broadly sessile abdomen.

PHYGADEUON sp.

There is a single specimen in the Scudder collection, No. 600, No. 2123, M. C. Z., Florissant, Col., which belongs without much doubt to this genus, but it is not in a sufficiently good state of preservation to describe. It is dark colored, with hyaline wings, and about 6 mm. in length.

HEMITELES Gravenhorst.

Four species belonging to this genus are contained in the present series.

Key to the Florissant species of Hemiteles.

1. Stigma narrow, lanceolate, nearly four times as long as its greatest width on a line perpendicular to the costa; large species, 9–10 mm. *H. priscus*, sp. nov.
 Stigma wide, subtriangular, marginal cell less than three times as long as wide; smaller species, not over 6 mm. 2.
2. First section of the radius distinctly shorter than the upper side of the second discoidal cell; antennae slender at base.
 *H. lapidescens*, sp. nov.
- First section of the radius as long or nearly as long as the upper side of the second discoidal cell 3.

3. Legs stout, marginal cell very short; discocubital vein only slightly curved *H. obtectus*, sp. nov.
 Legs slender, marginal cell longer; discocubital vein very strongly arcuately bent down toward the base . . . *H. suffocatus*, sp. nov.

HEMITELES PRISCUS, sp. nov. (Fig. 28.)

Female. Length 9.5 mm. Head and mesonotum probably entirely dark colored, the wings slightly tinged with brownish. Metathorax and abdomen yellowish brown, each abdominal segment with a broad black band at the apex. Head as broad as the thorax, about two and one-fourth times as wide as thick antero-posteriorly. Antennae quite stout throughout, the joints quadrate or slightly wider than long. Mesonotum smooth, metanotum finely

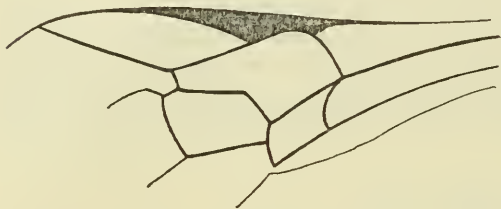


FIG. 28.— *Hemiteles priscus*, sp. nov. Type.

granulated and without any distinct carinae or areolation. Abdomen spatulate, the first segment rather suddenly widened at the apical third, its surface faintly roughened; remaining segments also faintly roughened, with the black bands smooth and shining. Ovipositor at least as long as the petiole of the abdomen

and probably longer as its tip is not preserved. Wings slightly infuscated; stigma and veins piceous, the former pale near the base. Areolet large, open, but pentangular in position. Discocubital vein sharply broken but without a stump of a vein at the fracture. Submedian cell slightly longer than the median; transverse median vein in hind wing broken somewhat below the middle, near the lower third.

One finely preserved specimen, seen in dorsal view.

Type.— No. 2124, M. C. Z., Florissant, Col. (No. 9071, S. H. Scudder Coll.).

HEMITELES LAPIDESCENS, sp. nov.

Female. Length 6 mm. Black; the abdomen dull brownish ferruginous, petiole black at base. Antennae fuscous, the legs except posterior coxae, femora, and base of tibiae, yellowish brown. Antennae about 25-jointed, slender basally and thickened toward the apex; first and second flagellar joints of equal length, each fully five times as long as thick; third, fourth, and fifth growing shorter, those toward the apex growing quadrate. Mesonotum smooth, the metanotum partially areolated on the sides posteriorly. Abdominal petiole about as long as the metathorax; seen obliquely from

the side it appears to be rather evenly curved and swollen at the apex, with the spiracles at the apical third. Seen from the side the body of the abdomen is rather slender, with a stout ovipositor that projects beyond the tip by a distance equal to one-third the length of the abdomen. Wings very faintly brownish, more distinctly so below the stigma. Stigma and veins pale fuscous, the former broad and almost subtriangular. Areolet of only moderate size, pentangular in position but open behind. Discocubital vein slightly and evenly curved; submedian cell slightly longer than the median.

One finely preserved specimen seen in lateral view.

Type.—No. 2125, M. C. Z., Florissant, Col. (No. 13,888, S. H. Scudder Coll.).

I think this is a true hemiteline although the abdominal petiole at first sight appears to be too stout and evenly curved. I am convinced, however, that this is due to twisting and splitting during the course of fossilization.

HEMITELES OBTECTUS, sp. nov. (Fig. 29.)

Female. Length 4 mm. Black, the abdomen shading to fuscous apically. Legs blackish, the hind coxae, trochanters and tibiae, except apex, brownish. Wings tinged with brownish, stigma and veins pale fuscous. Antennae rather stout, the joints of the basal part of the flagellum quadrate. Mesonotum smooth and shining. Metanotum areolated, at least on the sides. Abdomen sharply petiolate, the petiole only gradually enlarged behind (in lateral aspect) and bent down near the tip. Remaining segments of nearly equal height, the ovipositor not distinctly preserved to the tip, but apparently nearly as long as the abdomen exclusive of the petiole. Legs stout, unusually so for one of the Hemitelini, the hind femora and tibiae considerably thickened. Wings with broad, subtriangular stigma; radial cell short and broad, the first section of the radius only one-third as long as the second. Areolet open but pentangular in position. Basal nervure distinctly curved inward, the submedian cell a little longer than the median.

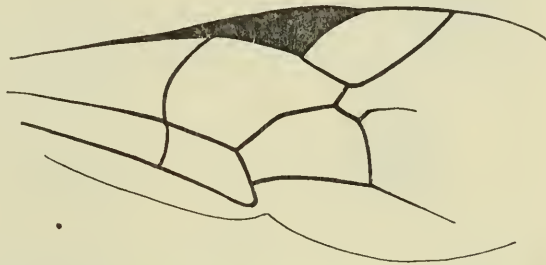


FIG. 29.—*Hemiteles obtectus*, sp. nov. Type.

Three specimens, one with reverse, all without doubt belonging to the same species.

Type.—No. 2126, M. C. Z., Florissant, Col. (No. 3298, S. H.

Scudder Coll.). Paratypes, Nos. 2127–2129, M. C. Z., Florissant, Col., (Nos. 5554, and 11,948, 11,966, reverse, S. H. Scudder Coll.).

I have been much in doubt concerning the proper location of this species. It is a winged female with the basal nervure rather more strongly curved than is usual among the Hemitelini, thus approaching the tribe Pezomachini, all of which are wingless in the female sex. The thick legs are also anomalous, but their appearance is quite likely due in part to compression in the stony matrix.

HEMITELES VETERNUS, sp. nov. (Fig. 30.)

Probably a male. Length about 5–6 mm. Head transverse, about twice as wide as thick, black. Antennae not preserved. Thorax elongate, twice as long as wide; smooth, not punctate. Scutellum elevated, triangularly narrowed behind. Metathorax completely areolated; median areola elongate, pentagonal; petiolar area short and broad; three lateral areas and one pleural one that may possibly be divided. Abdominal petiole long, in length equal to the metathorax and scutellum together, gradually widened, its spiracles near the tip. Following abdominal segments not or barely visible, probably lighter in color. Legs slender, more or less pale. Wings hyaline, the veins and stigma pale fuscous. Stigma subtriangular, marginal cell barely three times as long as high; areolet open, pentangular in position; discocubital vein very strongly bent toward the base, its base almost perpendicular to its tip. Second discoidal cell closed, submedian cell very slightly longer than the median.



FIG. 30.—*Hemiteles veternus*, sp. nov. Type.

One specimen and reverse, Nos. A90 and A108 from Station 17, collected by Mrs. W. P. Cockerell. Type in the Amer. Mus. Nat. Hist.

CRYPTUS DELINEATUS, sp. nov. (Fig. 31.)

Male. Length 11 mm. Very slender, black, with the antennae, abdomen, and legs more or less brownish. Antennae short, not over two-thirds the

length of the body, about 36-jointed; scape rounded: pedicel two-thirds the length of the first flagellar joint which is three times as long as thick; second to fourth twice as long as wide, the following one and one-half times for a considerable distance after which they become transverse some distance before the apex. Head rather flat, i. e. strongly transverse.

Thorax smooth or very faintly punctate. Metathorax incompletely areolated although there are indications of some carinae. Abdomen very slender.

Legs normal, long and moderately slender.

Wings elongate, narrow, hyaline, with brown stigma and venation; stigma

broadly lanceolate; radial cell quite narrow, the first section of the radius three-fourths as long as the second; areolet regularly pentangular; discocubital vein but slightly bent at the middle where there is a stump of a vein; submedian cell barely longer than the median; discoidal nervure broken below the middle.

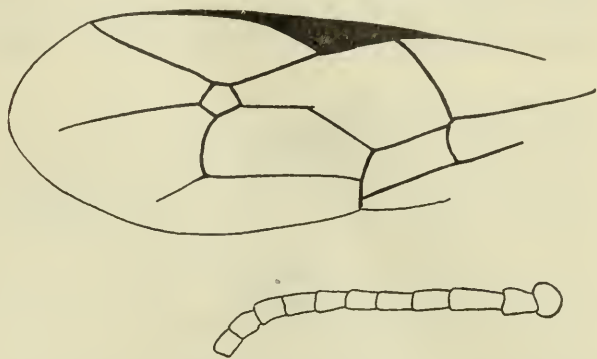


FIG. 31.—*Cryptus delineatus*, sp. nov. Type.

Type.—No. 2130, M. C. Z., Florissant, Col. (No. 11,962, S. H. Scudder Coll.).

One specimen, quite well preserved, and very clearly a male of *Cryptus*, *sensu lato*, even to the peculiar velvety surface of the antennae which is shown with wonderful fidelity.

PIMPLINAE.

Two species of *Acoenites* have been described, one from Radoboj by Heer ('49) and another from Florissant by Brues (:06). Although the abdominal petiole of the first species is much more strongly contracted than in species of the present day, there seems to be nothing to exclude it from location here.

LEPTOBATOPSIS ASHMEADII, sp. nov. (Fig. 32.)

Female. Length 9 mm. Light colored, probably light brownish yellow in life, like species of *Paniscus*. Wings hyaline. Antennae slightly shorter than the body, slender and of nearly even thickness; joints toward the base two and

one-half or more times as long as thick, those toward the apex becoming almost quadrate, probably about 40 joints in all. Mesonotum and pleurae smooth. Metathorax short, declivous and obtusely rounded above. Abdomen strongly petiolate, the first segment fully one and one-half times as long as the metathorax, very slender at the base, and evenly expanded toward the tip; second half as long as the first and much expanded as seen in lateral view; remaining segments forming a pointed, ovate body. Ovipositor at least as long as the

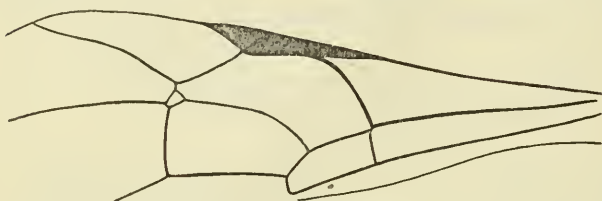


FIG. 32.—*Leptobatopsis ashmeadii*, sp. nov. Type.

body and perhaps longer as its tip is not visible. Legs, more especially the posterior pair long and slender. Posterior coxae very long, reaching to beyond the middle of the abdominal petiole, their trochanters extending to

beyond its tip. Femora short and stout, the tibiae as long as the femora and trochanters together. Wings hyaline, with light colored stigma and veins; stigma lanceolate; first section of the radius only about one-third as long as the second which is recurved in conformity with the costa, making the apical part of the marginal cell long and narrow. Median and submedian cells of equal length; discoidal nervure broken distinctly below the middle; discocubital vein evenly arcuate; areolet small, rhomboidal, distinctly petiolate above.

Described from one specimen collected at Station 13B by Mrs. W. P. Cockerell. Type in the Amer. Mus. Nat. Hist.

This is an undoubted acoenitine, but seems to be midway between *Leptobates* and *Leptobatopsis*, the latter genus perhaps being closer. Unfortunately Ashmead's description of *Leptobatopsis* (Proc. U. S. Nat. Mus., 1909, 23, p. 47, is very short and the type species there designated has never been described. However, the peculiar elongation of the abdomen is undoubtedly the same although the form of the areolet is more like that of *Leptobates* which has a nearly sessile abdomen.

The extensive group of *Lissonotini* has not hitherto been found in the fossil state, but I have discovered three species of *Lampronota* in the present collection.

LAMPRONOTA Haliday.

Key to the Florissant species of Lampronota.

1. Larger species, length 9 mm; median and submedian cells of equal length; areolet present *L. pristina*, sp. nov.
- Smaller, 5 mm. 2.

2. Areolet present, median and submedian cells of equal length.

L. stygialis, sp. nov.

Arolet wanting, submedian cell longer than the median.

L. tenebrosa, sp. nov.

LAMPRONOTA PRISTINA, sp. nov.

Female. Length about 9 mm. Ovipositor 10 mm. Head and thorax blackish, probably rufo-piceous; abdomen lighter, probably dark ferruginous or pale rufous. Head not preserved; antennae long and slender; basal flagellar joint about twice as long as thick; apical ones distinctly longer than thick. Thorax smooth and shining; metathorax regularly, but not completely areolated; with two transverse carinae, a median one between these, and a lateral one from the second transverse to the apex. Abdomen slender, smooth and shining. Ovipositor very long, equal to or somewhat greater than the length of the body. Legs rather stout, brownish. Wings subhyaline, veins and stigma fusco-piceous, the latter subovate. Areolet present, triangular and sessile above; recurrent nervure received midway between the first and second transverse cubitus; discocubital vein curved, more sharply so at the middle, but not broken. Median and submedian cells of equal length.

Type.—No. 2131, M. C. Z., Florissant, Col. (No. 16,369, S. H. Scudder Coll.).

There is another specimen received later from Professor Cockerell which appears to be the same collected at Station 14. However the ovipositor of the latter is apparently very distinctly shorter and it may represent a different species.

LAMPRONOTA STYGIALIS, sp. nov. (Fig. 33.)

Female. Length 5 mm. Ovipositor 1.6 mm. (or more?). Head and thorax black, abdomen except base ferruginous. Antennae very slender and rather long; basal joints very long, the first flagellar joint about five times as long as thick; thence growing smaller, the sixth a little more than twice as long as thick and the ones toward the apex only one-half or one-third longer than wide. Thorax



FIG. 33.—*Lampronota stygialis*, sp. nov. Type.

smooth and shining; the metanotum very incompletely areolated, but it is so crushed in the specimen that one cannot make out the position of the one

or two carinae that are present. Abdomen quite distinctly punctulate; slender, considerably enlarged apically. The ovipositor is visible for a distance equal to about two-thirds the length of the abdomen and was quite probably longer as the tip seems to be broken away. Legs entirely ferruginous. Wings hyaline, with pale fuscous veins and stigma. Areolet present, triangular, subsessile above, very long on the cubitus, the second transverse cubitus being so strongly oblique that it forms a straight line with the first abscissa of the radius. Recurrent nervure received by the cubitus far beyond the transverse cubitus; discocubital vein sharply curved and strongly bent down at its base; median and submedian cells of equal length.

Type.—No. 2132, M. C. Z., Florissant, Col. (No. 2524, S. H. Scudder Coll.).

The insertion of the recurrent nervure is peculiar in this species, being much farther from the transverse cubitus than in any living species with which I am familiar.

LAMPRONOTA TENEBROSA, sp. nov. (Fig. 34.)

Female. Length 5 mm. Ovipositor at least 6 mm. and probably longer as the tip is not visible. Black or dark colored, the apical part of the abdomen lighter. Wings hyaline. Antennae slender, the joints toward the base elongate, those near the apex only one-half longer than wide. Surface of head finely shagreened; pleurae smooth and shining. Metathorax rather low as seen in lateral aspect, evenly rounded above. Abdomen broadly sessile, its



FIG. 34.—*Lampronota tenebrosa*, sp. nov.
Type.

surface finely shagreened, the first segment apparently with a pair of longitudinal carinae although these may be due to pressure. Tip of abdomen considerably expanded. Legs rather stout, brownish in color. Wings hyaline, narrow. Stigma and veins dark brown, the former

oval, rather broader than usual; marginal cell small, the first section of the radius not more than one-fourth the length of the second; submedian cell slightly, but distinctly longer than the median; discocubital vein slightly and evenly curved; areolet wanting, the second recurrent nervure received a considerable distance beyond the transverse cubitus, nearly the length of the first section of the radius.

One specimen and reverse, Nos. B15 and B16, collected by Mr. S. A. Rohwer at Station 13B; complete, but with the details of structure not very clearly preserved. Type in the Amer. Mus. Nat. Hist.

Five genera of Pimplini, *Rhyssa*, *Glypta*, *Polysphincta*, *Pimpla*, and *Xylonomus* have been found in Tertiary deposits and all of these occur at Florissant. *Glypta* has been found by Scudder also in the Oligocene of Green River, Wyoming, *Pimpla* in a number of European localities and also at Quesnel, British Columbia, *Rhyssa* at Radoboj and at Green River. Of the entire number *Pimpla* is the most abundant, being represented by many species.

GLYPTA AURORA, sp. nov. (Fig. 35.)

Female. Length 9 mm. Black, sutures and tip of abdomen more or less light colored. Antennae short, about half the length of the abdomen; basal joints long; those at the middle and beyond nearly quadrate. Structure of thorax not discernible. First abdominal segment with very strong deep oblique grooves posteriorly, repeated less strongly on the second and third segments. Ovipositor preserved only at the extreme base. Wings hyaline, the stigma and veins piceous. Stigma and marginal cell very elongate

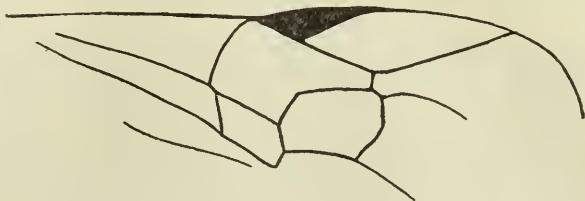


FIG. 35.—*Glypta aurora*, sp. nov. Type.

and narrow; areolet wanting, the recurrent nervure received nearly the length of the transverse cubitus beyond the base of the latter. Discocubital cell rather long, the discocubital vein rather sharply bent at its middle. Median cell shorter than the submedian; transverse median vein oblique.

Type.—No. 2133, M. C. Z., Florissant, Col. (No. 8153, S. H. Scudder Coll. Not very well preserved, but the only species of *Glypta* in the collection.

POLYSPHINCTA Gravenhorst.

Key to the Florissant species of Polysphincta.

1. Small, slender species, 6 mm. in length, median cell distinctly shorter than the submedian *P. mortuaria*, sp. nov.
- Larger species, median and submedian cells of equal length 2.
2. Length 12.5 mm.; transverse cubital nervure very short, not more than one-sixth as long as the greatest width of the marginal cell *P. inundata*, sp. nov.
- Length about 8 or 9 mm.; transverse cubital nervure fully one-third as long as the greatest width of the marginal cell.

P. petrorum, sp. nov.

POLYSPHINCTA MORTUARIA, sp. nov. (Fig. 36.)

Female. Length 6.5 mm. Small, slender, principally black, but varied somewhat with brown, especially on the abdomen. Head not preserved; the central part of the antennae visible, the joints slightly longer than wide. Thorax smooth or faintly punctulate, the metanotum with indications of a transverse and a lateral longitudinal carina. Abdomen sessile, elongate, grad-

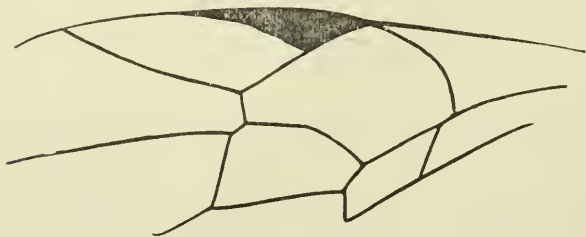


FIG. 36.—*Polysphincta mortuaria*, sp. nov. Type.

ually enlarged to the tip. Ovipositor preserved only at the base. Legs only in part preserved. They appear to be dark in color and apparently have some of the tarsi variegated or banded. Wings hyaline, stigma fuscous; nervures slightly lighter. Stigma

broadly lanceolate; marginal cell long and narrowly acuminate at the tip. Areolet wanting, the transverse cubitus long; recurrent nervure received considerably beyond the transverse cubitus. Cubitodiscoidal cell rather long, the cubitodiscoidal nervure slightly and evenly curved. Submedian cell much longer than the median, the transverse median nervure strongly oblique.

Type.—No. 2134, M. C. Z., Florissant, Col. (No. 13,397, S. H. Scudder Coll.).

POLYSPHINCTA INUNDATA, sp. nov.

Female. Length 12–13 mm. Large and stout; the body black, with a considerable amount of brown on the abdomen and legs. Antennae two-thirds the length of the body, slender, fusco piceous; basal joints of the flagellum about twice as long as wide; apical joints narrower, but smaller, being still twice as long as wide. Thorax quite distinctly and rather coarsely punctate, the pleurae more or less rugulose. Metanotum partially areolated. Abdomen stout, about one and one-half times as long as the head and thorax together; first segment black, more or less longitudinally rugulose and with a longitudinal lateral carina; following segments fuscous, indistinctly sculptured. Ovipositor as long as the abdomen and probably longer, as its tip is not preserved. Wings subhyaline; stigma and veins dark fuscous; stigma broadly lanceolate; marginal cell long, narrow, strongly acuminate toward the tip. Transverse cubitus very short, separated from the recurrent nervure by twice its length. Discocubital cell long, the discocubital vein rather sharply bent at its middle. Submedian cell no longer than the median, the transverse median nervure scarcely oblique.

Type.—No. 2135, M. C. Z., Florissant, Col. (No. 16,372, S. H. Scudder Coll.).

POLYSPHINCTA PETRORUM, sp. nov. (Fig. 37.)

Female. Length 8-9 mm. Entirely black, except the last abdominal segment and the apical part of the venter. Antennae nearly three-fourths as long as the body, the basal joints of the flagellum very long, fully five or more times as long as thick, apical joints suddenly becoming much shorter, subquadrate. Thorax distinctly punctulate, the pleurae and metanotum in great part finely rugose. Metathorax apparently completely areolated with the exception of the apical pleural areas; the spiracle large, oval. Abdomen nearly twice as long as the head and thorax together, much enlarged apically. First segment longitudinally aciculate and rugulose, with lateral carinae. Following segments not coarsely sculptured.



FIG. 37.—*Polysphincta petrorum*, sp. nov. Type.

Ovipositor not entirely preserved, more than one-half the length of the abdomen. Wings subhyaline, stigma and veins piceous. Marginal cell rather broad and short; transverse cubitus long, separated by about its own length from the recurrent nervure. Discocubital cell long; the discocubital vein rather sharply but only slightly bent at its middle. Median and submedian cells of equal length, the transverse median nervure scarcely oblique.

Type.—No. 2136, M. C. Z., Florissant, Col. (No. 12,947, S. H. Scudder Coll.).

POLYSPHINCTA SAXEA Scudder.

Rept. Geol. Surv. Canada, 1875-76, 1877, p. 268.

This is probably a *Polysphincta*.

PIMPLA Fabricius.

Key to the Florissant species of Pimpla.

1. Discocubital vein with a long stump of a vein, areolet with a rather long petiole above; abdomen conspicuously banded.

P. appendigera Brues.

- Discocubital vein without a stump, or at most with a slight trace of one 2.

2. Mesonotum and occiput deeply and coarsely punctate, sides of head and pleurae longitudinally rugulose; metanotum rugulose; areolet broadly sessile above *P. morticina*, sp. nov.
Body at most punctulate, never longitudinally rugose 3.
3. Areolet distinctly petiolate, petiole quite long. *P. revelata*, sp. nov.
Arolet sessile or subsessile above 4.
4. Marginal cell and stigma long and slender, the extreme height of the cell less than three times that of the areolet. *P. senilis*, sp. nov.
Marginal cell and stigma broad, the height of the cell considerably over five times that of the areolet *P. rediviva*, sp. nov.

PIMPLA APPENDIGERA Brues.

Bull. Amer. mus. nat. hist., 1906, 22, p. 494.

This species, originally described from a single specimen, is represented in the Scudder collection by no less than twenty examples, and I have also received one from Professor Cockerell and examined another from the same deposits belonging to the British Museum.

It therefore appears to be the commonest ichneumonid occurring at Florissant and also resembles recent species of *Pimpla* more closely than any of the other fossil Florissant species. In addition to the original description it may be added that the size of most of the specimens is considerably in excess of that given for the type, some of them being over 10 mm. in length.

I have seen only a single male No. 2137, M. C. Z., (No. 14,285, S. H. Scudder Coll.). It is very slender and measures 7 mm. The abdomen is banded, and aside from sexual differences it resembles the female very closely.

The following are the numbers of the specimens representing this species in the material before me:

Nos. 2137-2155, M. C. Z. (S. H. Scudder Coll.). 198, 2425, 3594, 6684, 7263, 8921-(8131-8186), 8709, 9091, 16,367, 11,458, 11,468, 14,285, 12,338, 11,943, 13,776, (8080-8353). Amer. Mus. Nat. Hist., A143. British Museum, I. 7380.

PIMPLA MORTICINA, sp. nov.

Female. Length 9-10 mm. Probably entirely black. Head deeply and coarsely punctate; antennae with about 28 joints, short and stout, the basal ones being only twice as long as thick; those near the middle slightly transverse, and the apical ones strongly so. Mesonotum coarsely punctate like the head; pleurae longitudinally rugulose or corrugate. Metanotum with a superior median, petiolar, and two lateral areas fully enclosed. Spiracle

large, rounded oval. Abdomen short and stout; first segment ornamented and grooved laterally. Following segments shining and nearly smooth, second and third of equal length. Ovipositor short, one-half as long as the abdomen. Legs short and stout, entirely black. Wings hyaline, stigma elongate and narrow, pectus, veins pectus; marginal cell rather short. Areolet large, broadly sessile above, discocubital cell short, the discocubital vein strongly curved; median and submedian cells of equal length.

Type.—No. 2156-2157, M. C. Z., Florissant, Col. (No. 13,470 and 13,851 (reverse), S. H. Scudder Coll.).

This is a very roughly sculptured species with short, stout legs and antennae.

PIMPLA REVELATA, sp. nov. (Fig. 38.)

Female. Length 10 mm. Body black, or very dark colored; abdomen beyond the first segment rufous or ferruginous. Antennae with only the extreme base preserved; they probably had long joints, the first flagellar appearing about four times as long as thick and rather slender. Thorax above finely punctate; metanotum considerably crushed, but several carinae are evident indicating that it was areolated at least in part. Abdomen as usual in *Pimpla*, with slight indications of oblique grooves on the median segments; second to fifth segments of nearly equal length, each about one-third wider than long. Legs not visible in the type, but in another specimen which most probably belongs to this species, they are black with a broad pale ring on the hind tibiae, and with variegated tarsi. Wings hyaline, with pale fuscous stigma and venation. Stigma and marginal cell long and narrow, areolet rather small, very oblique, with a long petiole above; discocubital cell long, the discocubital vein slightly angled, and with a faint trace of a stump of a vein; submedian cell considerably longer than the median, the transverse median vein very oblique.



FIG. 38.—*Pimpla revelata*, sp. nov. Type.

Type.—No. 2158, M. C. Z., Florissant, Col. (No. 11,472, S. H. Scudder Coll.). There is also a second specimen No. 2159, M. C. Z., Florissant, Col., No. 2539, S. H. Scudder Coll.) which is most likely the same species.

PIMPLA SENILES, sp. nov. (Fig. 39.)

Female. Length about 8.5 mm. Blackish; legs in part ferruginous, abdomen fasciate with pale bands. Head minutely punctulate; antennae long

and rather slender, particularly toward the tips; joints all apparently rather short, about one-half longer than wide. Thorax punctulate like the head, the metanotum with only the faintest indications of carinae and no distinct areas. Abdomen long and rather slender, its surface regularly roughened and sparsely punctate; first segment with a strong lateral and several less evident irregular longitudinal carinae. First segment one-third longer than the second; fourth equal to the second; third somewhat shorter; first to third with pale bands apically. Ovipositor one-half as long as the abdomen, its

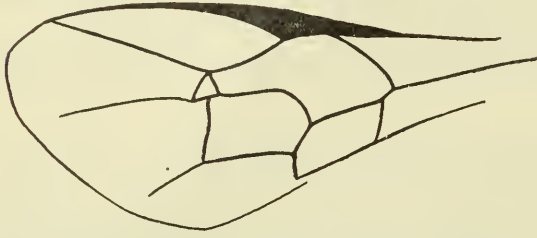


FIG. 39.—*Pimpla senilis*, sp. nov. Type.

sheaths thickly hairy. Legs moderately stout; in part ferruginous; coxae, trochanters, and perhaps the base of the hind tibiae of this lighter color. Wings hyaline, nervures and stigma piceous; stigma and marginal cell long and narrow; areolet rather large, oblique, subsessile

above; discocubital cell rather short, the discocubital vein very strongly arcuately bent down basally; submedian cell considerably longer than the median, the transverse median nervure slightly oblique.

Type.—No. 2160, M. C. Z., Florissant, Col. (No. 11,418, S. H. Scudder Coll.).

PIMPLA REDIVIVA, sp. nov. (Fig. 40.)

Female. Length 8 mm. Black, the apex of the abdomen brownish and the sutures between its segments pale. Head and thorax dull, but scarcely at all punctulate. Antennae not preserved. Metanotum areolated, the pleural and basal and middle lateral areas visible in the side view of the specimen. Spiracle large, rounded oval. Abdomen short, strongly punctate basally, the first segment with some rather small, but sharp carinae toward its base; second segment fully as long as the first; third, fourth, and fifth growing shorter. Ovipositor preserved only at its base; legs not preserved. Wings hyaline, with pale fuscous stigma and nervures; stigma and marginal cell rather short, the former distinctly triangular in outline. Areolet moderately small, broadly sessile above; discocubital cell long; discocubital vein

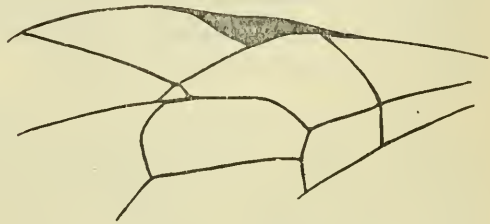


FIG. 40.—*Pimpla rediviva*, sp. nov. Type.

evenly but not strongly curved. Median and submedian cells of equal length.

Type.—No. 2161, M. C. Z., Florissant, Col. (No. 5546, S. H. Scudder Coll.).

PIMPLA sp.

There is also a single male *Pimpla*, No. 2162 M. C. Z., Florissant, Col. (No. 12,887, S. H. Scudder Coll.), but I cannot associate it with certainty with any of the foregoing species. It measures 8 mm. and has a banded abdomen.

XYLONOMUS SEJUGATUS, sp. nov.

Female. Length 15 mm. Black, the anterior legs and the posterior tibiae and tarsi brownish; abdomen more or less piceous. Wings subhyaline, clear, but with a slight trace of infuscation. Ovipositor visible for 10 mm. at which point it is broken at the edge of the stone. Size and stature of *X. humeralis* Say. Antennae only in part preserved; black, the joints near the base of the flagellum nearly twice as wide as long. Mesonotum and pleurae smooth or nearly so; metanotum distinctly, but only partially areolated as in *X. humeralis*. Abdomen twice as long as the head and thorax together, the first segment as long as the second and third combined, irregularly striated along the sides; third shorter than the second; fourth as long as the third; fifth, sixth, and seventh longer, but not much higher than the fourth, the abdomen being only gently swollen at the apex. Legs long, especially the hind pair. Hind coxae swollen, more near the base, the hind femora and tibiae rather thick. Wings with a narrow stigma which is pale at the base and fuscous apically. Nervures piceous. Areolet absent, the radial and cubital veins very closely approximated at this point where they are somewhat thickened. Marginal cell very long, the second section of the radius nearly three times as long as the first.

Described from one specimen and part of its reverse.

Type.—No. 2211–2212, M. C. Z., Florissant, Col. (No. 11,474 and 11,631, reverse, S. H. Scudder Coll.).

This is an undoubted *Xylonomus*, and is strikingly similar in appearance to the recent *X. humeralis* Say. It differs, however in the shorter basal segments of the abdomen, which is less strongly clavate. It is a very handsome species. No. 2213, M. C. Z., Florissant, Col. (No. 4444, S. H. Scudder Coll.) seems to be the same, but is not well enough preserved to be positively placed.

TRYPHONINAE.

This subfamily is not very abundantly represented in the Florissant fauna, although I have recognized species belonging to six genera, all of them modern and occurring in this same region at the present day. These are *Mesoleptus*, *Tryphon*, *Orthocentrus*, *Camerotops*, *Exochus*, and *Tylecomnus*.

According to Brischke ('86) *Mesoleptus* and *Tryphon* occur in Baltic Amber and Scudder ('90) has described an *Eclytus* from the Oligocene of Green River, Wyoming. *Bassus* has been said by Keferstein ('34) to occur in Baltic Amber.

MESOLEPTUS Gravenhorst.

Key to the Florissant species of Mesoleptus.

- . . Areolet open *M. apertus*, sp. nov.
 . . Areolet closed *M. extirpatus*, sp. nov.

MESOLEPTUS APERTUS, sp. nov. (Fig. 41.)

Female. Length 5 mm. Body black or dark colored, the apical segments of the abdomen brownish; wings slightly infuscated. Head, thorax, and first

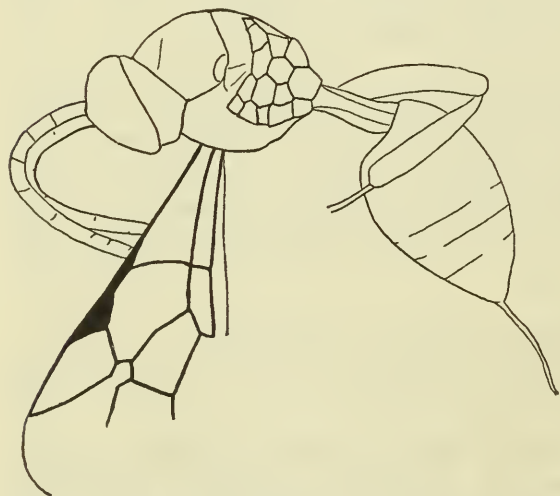


FIG. 41.—*Mesoleptus apertus*, sp. nov. Type.

abdominal segment smooth and highly polished. Antennae moderately slender, their apices not preserved in the type specimen; basal flagellar joints from two and one-half to four times as long as thick, those toward the apex somewhat transverse. Mesonotum without furrows. Scutellum strongly convex, with a large, broad groove at its base; metanotum completely, very regularly and distinctly areolated, its surface polished. Abdominal petiole slightly shorter than the metathorax, with two widely separated longitudinal discal carinae. Abdomen suddenly widened behind the petiole, oval in shape. Ovipositor one-half as long as the abdo-

widely separated longitudinal discal carinae. Abdomen suddenly widened behind the petiole, oval in shape. Ovipositor one-half as long as the abdo-

men. Wings very slightly infuscated; stigma dark brown and veins rather light; stigma elongate, but distinctly angulate below. Marginal cell short and broad, fully twice as wide as the stigma and twice as long as thick; cubitodiscoidal cell short; areolet open; median and submedian cells of equal length.

Type.—No. 2214, M. C. Z., Florissant, Col. (No. 8893, S. H. Scudder Coll.

There is also a second No. 2215, M. C. Z., Florissant, Col. (No. 4671, S. H. Scudder Coll.) which is not so well preserved, but possibly the same species.

MESOLEPTUS EXSTIRPATUS, sp. nov. (Fig. 42.)

Sex? Length 6 mm. Black, the abdomen beyond the second segment reddish brown; legs yellowish, the posterior pair darker, more brownish. Wings subhyaline. Head transverse, its surface smooth and highly polished. Antennae moderately stout, of even thickness, the first joint of the flagellum twice as long as wide; following subequal, but gradually shortening; those beyond the middle but little longer than wide, apex missing. Thorax smooth



FIG. 42.—*Mesoleptus exstirpatus*, sp. nov. Type.

and shining; metathorax areolated, apparently completely so. Abdomen as long as the head and thorax combined; slender, petiolate. Petiole evenly arcuate, with two pairs of longitudinal carinae which extend for its entire length. Wings subhyaline, the stigma narrowly oval, fuscous; veins fuscous. Sections of the radius all slightly curved; first about three-fourths the length of the third; areolet large, regularly pentangular; median and submedian cells of equal length; discocubital vein regularly and quite strongly curved.

Described from one specimen collected by Mr. S. A. Rohwer at Station 14. Type in the Amer. Mus. Nat. Hist. A typical species of this extensive genus.

TRYPHON Fallen.

Key to the Florissant species of Tryphon.

1. Antennae filiform as usual in the genus; abdomen sessile or broadly petiolate 2.
 Flagellum of antennae very distinctly thickened or flattened medially; abdomen strongly petiolate . *T. lapideus*, sp. nov.
2. Stigma broad, more or less triangular in outline 3.
 Stigma long and narrow, lanceolate 4.
3. Submedian cell considerably longer than the median; first abdominal segment with discal carinae only on the basal half.
 T. cadaver, sp. nov.
- Median and submedian cells of equal length, discal carinae on first segment of abdomen extending to the tip. *T. senex*, sp. nov.
4. Median and submedian cells of equal length, abdomen rather distinctly petiolate *T. peregrinus*, sp. nov.
- Submedian cell considerably longer than the median, abdomen broadly sessile *T. florissantensis*, sp. nov.

TRYPHON LAPIDEUS, sp. nov.

Length 7.5 mm. Black, the legs brownish and the abdomen beyond the first segment brownish or reddish. Antennae very short and stout; two-thirds the length of the body and very distinctly thickened (? flattened) near the middle of the flagellum; about 20-jointed, joints near the base fully twice as long as wide; those toward the apex of the broadened portion distinctly wider than long. Surface of head and all of thorax and pleurae shining, impunctate. Metathorax very distinctly areolated, but apparently not completely so. Abdomen quite distinctly petiolate, the petiole as long as the slope of the metathorax and gradually enlarged to the tip; second segment wider (seen in lateral view), but only one-half as high as long at apex, slightly shorter than the first; third longer than the second and distinctly more than half as high as long; following segments shorter and higher. Legs moderately stout. Wings quite distinctly infuscated, the stigma long and lanceolate; submedian cell very little longer than the median; cubitodiscoidal cell long, its narrowed apical portion being elongated. Areolet open at apex. Marginal cell rather broad and short. First recurrent nervure broken at the middle.

Type.—No. 2235, M. C. Z., Florissant, Col. (No. 1796, S. H. Scudder Coll.).

This is a very puzzling specimen and I do not feel satisfied with its present location although it is no doubt a member of the Tryphoninae.

However, the flattened antennal flagellum should make the species readily recognizable, as this character occurs only in isolated genera of the Ichneumonidae. On account of this peculiarity I dislike to leave it undescribed.

TRYPHON CADAVER, sp. nov. (Fig. 43.)

Female. Length 4.5 mm. Black; the legs and second and third segments of abdomen pale brownish or reddish, except the base of the third which is piceous; apical segment of abdomen dark brown. Head smooth, not punctate, shining. Antennae three-fourths the length of the body; rather slender; about 22-jointed, although some of the articulations are obliterated; first flagellar joint over three times as long as thick; those near the middle not quite twice as long as thick; near the apex scarcely longer than wide. Mesonotum shining, distinctly punctate toward the posterior margin; parapsidal furrows entire, deep and distinct. Metanotum shining, completely areolated. Abdomen broadly sessile, first segment only one-fourth or one-third longer than wide at tip, strongly raised medially; on its basal half with two discal carinae which strongly converge and fade out at the middle. Lateral carinae complete, very close to the margin; spiracles placed distinctly before the middle. Second segment two-thirds as long as the first and twice as wide as long; third to fourth gradually shorter and wider; fifth segment the widest. Legs rather stout, at least the posterior pair. Wings hyaline, stigma and veins light brown. Stigma broad, subtriangular; marginal cell small; second section of the radius nearly three times as long as the first. Submedian cell considerably longer than the median, the transverse median vein very oblique; cubitodiscoidal cell rather short. Areolet present, but neither of the transverse cubiti very strongly colored; first recurrent nervure broken considerably below the middle.



FIG. 43.—*Tryphon cadaver*, sp. nov. Type.

Type.—No. 2236, M. C. Z., Florissant, Col. (No. 8176, S. H. Scudder Coll.).

TRYPHON SENEX, sp. nov. (Fig. 44.)

Sex? Length about 6 mm. Apparently entirely dark colored, the legs and the apical part of the abdomen, lighter, yellowish, but this may be due to unnatural stains as the rock is strongly yellow. Antennae rather stout, the apical part not preserved; joints, even toward the base of the flagellum, quadrate. Surface of head nearly smooth but opaque. Pleurae and metanotum highly polished; propleurae roughly striated or fluted along the posterior



FIG. 44.—*Tryphon senex*, sp. nov. Type.

margin, the epomial carina distinct. Metanotum more or less transversely wrinkled; areolated,—apparently completely so. Abdomen subsessile, the first segment with a pair of widely separated discal carinae that extend to the tip and a lateral carina which also extends to the tip; second and third segments subequal, each as long as the first, without grooves or carinae. Legs moderately stout. Wings hyaline, with brown stigma and veins. Stigma rather broad, almost subtriangular in form; radial cell short and broad, only twice as long as wide; first section of the radius nearly one-half as long as the second; cubitodiscoidal cell very short; median and submedian cells of equal length; first recurrent nervure broken considerably below the middle; areolet indicated, but the external vein is nearly hyaline.

Described from one specimen from Professor Cockerell, No. A62. Type in the Amer. Mus. Nat. Hist.

TRYPHON PEREGRINUS, sp. nov. (Fig. 45.)

Female. Length 7 mm. Color not well preserved; probably dark, with the abdomen and legs more or less brownish or reddish. Antennae not preserved. Thorax smooth, the pleurae more or less aciculate, particularly the propleurae and the mesopleurae above. Metanotum apparently completely areolated, but the carinae are not so prominent as usual. Basally it is smooth, but apically more or less rugose. Abdomen rather distinctly petiolate, the spiracles not visible in the specimen. Second segment as long as the petiole, and seen from the side it is enlarged toward the apex which is nearly twice as high as the base; following segments gradually decreasing in length. Legs

long and slender. Wings hyaline, stigma narrow, lanceolate; marginal cell also very long and slender, the first section fully one-half as long as the second. Areolet indicated as pentangular, but open behind, or at least with the closing



FIG. 45.—*Tryphon peregrinus*, sp. nov. Type.

nervure subobsolete; discocubital cell very long, its apical part being much elongated and narrow; median and submedian cells of equal length; first recurrent nervure broken just below the middle.

Described from one specimen characterized by its much elongated wings.

Type.—No. 2237, M. C. Z., Florissant, Col. (No. 13,456, S. H. Scudder Coll.).

TRYPHON FLORISSANTENSIS, sp. nov. (Fig. 46.)

Sex? Length 6 mm. Black, the abdomen beyond the petiole, reddish brown. Antennae rather long and slender; four-fifths the length of the body; about 28-jointed, the joints toward the base of the flagellum about one-half longer than thick, those near the apex scarcely longer than thick. Head and thorax smooth and shining, finely punctulate; lower part of mesopleura more distinctly so. Metathorax completely areolated. Abdomen broadly sessile, the first segment with a pair of convergent discal carinae that extend to just

beyond the middle, but with no lateral ones behind the spiracle which is placed distinctly before the middle. Second to sixth abdominal segments each about



FIG. 46.—*Tryphon florissantensis*, sp. nov. Type.

equal in length, and each two-thirds as long as the first. Wings hyaline, the stigma rather long, lanceolate, fuscous. Venation fuscous, the veins stout. Areolet absent, the recurrent nervure received one-half the length of the transverse cubital vein beyond the base of the latter; submedian cell longer than the median by two-thirds the length of the transverse median nervure which is strongly oblique. Marginal cell rather small and narrow, pointed, the second section of the radius two and one-half times as long as the first; first recurrent nervure broken just below the middle. Posterior legs rather stout, black, their tibiae apparently white except at base and apex.

Described from a single specimen collected by Mr. S. A. Rohwer at Station 13. Type in the Amer. Mus. Nat. Hist.

ORTHOCENTRUS Gravenhorst.

Two species are known from Florissant, one here described as new and the other characterized in a previous paper (Brues :06). They are separable as follows:

Key to the Florissant species of Orthocentrus.

1. Posterior tibiae scarcely longer than their femora, radius of wing evenly curved, submedian cell but little longer than the median.

O. primus Brues.

Posterior tibiae one-third longer than their femora; radial vein strongly bent above the areolet, elsewhere nearly straight, submedian cell considerably longer than the median.

O. defossus, sp. nov.

ORTHOCENTRUS DEFOSSUS, sp. nov. (Fig. 47.)

Sex? Length probably about 6-7 mm., the insect completely bent on itself. Black or dark colored, the abdomen beyond the petiole brownish yellow. Legs fuscous; at least the posterior pair with the trochanters considerably

lighter. Antennae extremely stout and thick; the scape large, cylindrical, something over twice as long as wide; joints of the basal half of the flagellum much wider than long; those beyond more nearly quadrate; in all the flagellum is composed of about 24 joints; metathorax partially areolated, none of the carinae very strongly elevated. Abdomen gradually thickened toward the tip. Wings hyaline, the stigma dark and the veins light brown. Stigma moderately broad, about two-fifths as broad as the marginal cell which is two and one-half times as long as broad. Areolet rather large, pentangular, the vein closing it distinct but paler than the others; radial vein sharply bent over the areolet, its sections nearly straight elsewhere. Discocubital vein very little curved; transverse median vein inserted a considerable distance beyond the basal vein, but little oblique. Legs stout, but the posterior femora are not over one-third as broad as long, and one-fourth shorter than their tibiae.



FIG. 47.—*Orthocentrus defossus*, sp. nov. Type.

Described from one specimen.

Type.—No. 2238, M. C. Z., Florissant, Col. (No. 10,591, S. H. Scudder Coll.).

CAMEROTOPS SOLIDATUS, sp. nov.

Sex? Length probably about 6 mm., the tip of the abdomen flaked off in the specimen. Black, the abdomen beyond the petiole and the legs brown. Antennae very stout and short; most of the joints quadrate, or barely wider than long; those near the base a trifle more elongate. Thorax shining, the sutures of the pleurae crenulate; mesopleura with a very distinct carina along its anterior margin. Metanotum only partly areolated, the pleural areas being confluent. Abdomen sessile, although rather narrowly so; the first segment very strongly convex above when seen in lateral aspect, with two median carinae which reach two-fifths the way to the tip and a lateral one which almost attains the tip. Legs very stout, the posterior femora nearly one-third as wide as long. Wings hyaline, the stigma piceous, very broad and subtriangular in outline. Radial nervure sharply bent at the insertion of the transverse cubitus, its sections nearly straight, the second over three times as long as the first.

Type.—No. 2239, M. C. Z., Florissant, Col. (No. 8309, S. H. Scudder Coll.). Described from one specimen only moderately well preserved. However, its place in the tribe is certain and the generic reference accurate beyond reasonable doubt on account of the broad stigma and the mesopleural carina.

EXOCHUS CAPTUS, sp. nov. (Fig. 48.)

Female. Length 6 mm. Dark colored, probably black, the apical part of the abdomen brownish; legs apparently also dark. The insect from its impression appears to have been very hard-bodied and highly polished, only the mesonotum and the propleurae above showing a duller surface and faint punctulation. Antennae not well preserved but apparently typical, the joints



FIG. 48.—*Exochus captus*, sp. nov. Type.

not far from the base of the flagellum about quadrate in shape; those toward the apex seemingly considerably longer. Metathorax completely and very distinctly areolated, the areas all smooth and polished. Abdomen clavate, the carinae on the petiole reaching to about the middle of the segment, the lateral pair somewhat

longer than the median ones. Second segment a trifle shorter than the petiole, the others to the sixth growing very gradually shorter. Ovipositor barely exerted. Wings hyaline, venation as usual in the genus, the stigma and marginal cell narrow; second section of the radius three times as long as the first; submedian cell much longer than the median. Legs very stout, the hind tibiae with two spurs.

One specimen seen in side view, well preserved and very characteristic of the tribe Exochini, although its position in the typical genus is not so certain. No. A48, type in the Amer. Mus. Nat. Hist.

TYLECOMNUS Holmgren.

Key to the Florissant species of Tylecomnus.

1. Areolet open *T. davisii*, sp. nov.
- Arolet closed and petiolate *T. pimploides*, sp. nov.

TYLECOMNUS DAVISII, sp. nov.

Female. Length 11.5 mm. Black or dark colored, including the legs. Antennae brown; each abdominal segment with a broad pale band at the apex. Head apparently smooth above and behind, but strongly punctate on the face. Antennae setaceous, thick basally, the tips broken off with the stone; first flagellar joint about twice as long as thick and as long as the second and third together; second quadrate; third one-half longer than wide,

as thick as the second; following gradually and distinctly wider toward the middle of the flagellum, beyond which they become narrower; those near the middle over twice as wide as long. Mesonotum and pleurae rather closely punctate. Metanotum finely granular, completely areolated. Abdomen nearly twice as long as the head and thorax combined, clavate, gradually enlarged to the tip. First and second segments with two complete discal and a lateral carina, those on the first regularly convergent apically. First segment nearly as long as the slope of the metathorax; second and third of about equal length, but higher; following nearly as long and gradually higher. Ovipositor short and very slender, scarcely projecting. Posterior legs rather long and stout. Wings hyaline. Stigma and veins pale. Stigma long, almost linear; marginal cell extremely long and narrow. Areolet open; cubitodiscoidal cell long and narrow. Submedian cell a little longer than the median; first recurrent nervure curved, strongly oblique, broken below the middle.

Type.—No. 2240, M. C. Z., Florissant, Col. (No. 5963, S. H. Scudder Coll.). This is a very large conspicuous species and seems without any doubt to belong here.

TYLECOMNUS PIMPLOIDES, sp. nov. (Fig. 49.)

Female. Length 14–16 mm. Apparently entirely dark colored although the type specimen is irregularly discolored and shows yellowish markings. Antennae long and stout, tapering, with very many joints; second and third flagellar joints each but little longer than wide; joints toward the middle

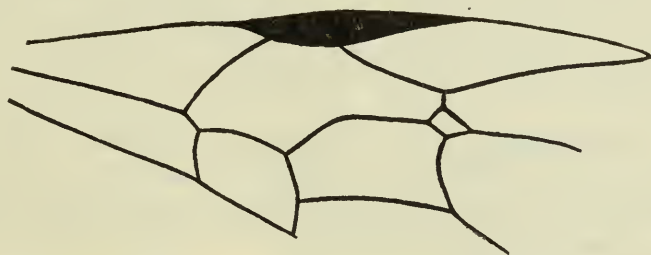


FIG. 49.—*Tylecomnus pimploides*, sp. nov. Type.

about half wider than long; apical joints smaller, about quadrate. Head large, broadly transverse; face densely punctate. Mesonotum with deeply impressed parapsidal furrows which are widely separated at the base of the scutellum. Pleurae in front strongly horizontally wrinkled. Scutellum strongly convex, the depression at its base with high carinae laterally. Metanotum above with four carinae which separate large oblong median, lateral and pleural areas. Posterior edge with a transverse carina and posterior face with a short median carina that separates two small areas. Abdomen very broad at the base; first segment a little less than twice as long as wide, with

two very pronounced longitudinal carinae that originate near the basal angles, curve centrally and divide the segment into three nearly equal parts; they continue in a slightly divergent direction on the basal half of the second segment. Second segment at apex one-half wider than long; third, fourth, and fifth of about equal length. Wings hyaline, veins fuscous. Stigma and marginal cell long and narrow. Areolet subtriangular, with a long petiole above. Discocubital vein rather sharply curved at its middle. Submedian cell much longer than the median.

Three specimens.

Type.—No. 2241, M. C. Z., Florissant, Col. (No. 5447, S. H. Scudder Coll.). Also two specimens later sent by Professor Cockerell, Nos. B3 and B5.

This is a peculiar species and seems to be best regarded as *Tylecomnus* as I cannot find any other genus to which it may be certainly referred. The areolet will distinguish it from the other fossil species just as this character forms two groups among living species.

OPHIONINAE.

This group is well represented at Florissant by 23 species belonging to eleven genera, all but two of which are known by living species. Of these, three (*Anomalon*, *Limnerium*, *Mesochorus*) are especially prominent and are each represented by several species and numerous specimens. There have previously been recognized from the Tertiary in other parts of the World four genera, three of which, *Mesochorus*, *Anomalon*, and *Porizon* occur at Florissant, but only two species have been described, one *Anomalon* by Heer from Oeningen and one *Mesochorus* from Green River, Wyoming by Scudder. The latter was made the type of a new genus *Lithotorus* by Scudder, but it is evidently a true *Mesochorus* being much more typical than any of the several species here described from Florissant.

The small group *Hellwigiini* is represented by two living genera, both of which occur in the Old World. From Florissant, I have recognized a third which shows undoubted affinities with *Hellwigia*, although it is more generalized in several respects as can be seen from the following diagnosis.

PROTOHELLWIGIA, gen. nov.

Slender species of rather large size. Abdomen with a long slender petiole. Antennae about two-thirds the length of the body, rather distinctly thickened

toward the middle and decreasing in thickness on apical third. Metathorax somewhat produced behind the insertion of the hind coxae. Abdominal petiole sharply thickened on the apical third; second and third segments each two-thirds as long as the first, compressed; following shorter and more strongly compressed. Wings with the stigma very slender, scarcely apparent; radial vein inserted near its middle; radial cell long and lanceolate, reaching nearly to the wing tip; transverse cubitus oblique above and strongly bowed outwardly below, meeting the cubitus barely beyond the recurrent nervure, which is almost interstitial; discocubital vein not broken; submedian cell shorter than the median and subdiscoidal nervure in front wing originating very near the upper angle of the second discoidal cell; transverse median nervure in hind wing broken near its lower third.

Type.—*P. obsoleta*, sp. nov.

I cannot reconcile the characters of the type species with those of any described genus known to me and feel compelled to add another name to the already large number of ophionine genera. The peculiar curvature of the transverse cubitus and insertion of the recurrent nervure place it definitely in the tribe Ophionini (including Hellwigiini) and close to *Hellwigia* from which it differs by the more generalized form of the antennae and by its different wing venation.

PROTOHELLWIGIA OBSOLETA, sp. nov. (Fig. 50.)

Length 13–17 mm. Dark colored, with hyaline wings and conspicuously banded abdomen. The abdomen has a broad pale band above at the apex of each segment (except the first) which occupies one-half of the surface. The venter is pale, with a series of black spots laterally opposite the dark bands on the dorsum. The antennae are stout, lighter colored toward the middle, with most of the joints considerable wider than long and not very distinctly separated. The body of the thorax is not very well preserved in any of the specimens, but there seem to be distinctly defined parapsidal furrows and the metanotum appears to be partially areolated. Mesonotum finely punctate, scutellum convexly elevated. Legs slender, the femora of the posterior pair slightly thickened. Wings entirely hyaline, the stigma and veins fuscous.



FIG. 50.—*Protohellwigia obsoleta*, gen. et sp. nov.
Type.

There are nine specimens before me, of unknown sex, presumably females although no trace of ovipositor is preserved in any case.

Type.—No. 2242, M. C. Z., Florissant, Col. (No. 11,927, S. H. Scudder Coll.). Other specimens in the Museum of Comparative Zoölogy are:—Nos. 2243–2249, Florissant, Col. (Nos. 2138, 4795, 8086, 9043, 11,471, 14,974 and 14,983, S. H. Scudder Coll.). Professor Cockerell also sent me a well-preserved specimen with reverse collected at Station 17.

There seems to be no representative of the tribe Ophionini at Florissant, nor have any been discovered at Oeningen or Radoboj. Serres ('29), however, has recorded the occurrence of Ophion in the Lower Oligocene at Aix.

No representative of the tribe Nototrachini has been found in the fossil state. Its distinguishing character of a single tibial spur on the middle leg is one that can scarcely ever be made out in the fossil, so that its confusion with the preceding tribe must inevitably occur in palaeontological work.

In Europe the genus *Anomalon* has been recognized at two places, one species described and figured by Heer ('49) from the Upper Miocene at Oeningen as *Anomalon protogaeum* which very evidently belongs to the Anomalini although its position in the genus *Anomalon*, *s. str.* is not so certain, and *Anomalon* sp. by Serres at Aix in the Lower Oligocene which its describer compares with *A. variegatum*, supposedly a recent species, but one which I have not been able to locate.

In the present collections from Florissant, there are six easily recognized species of Anomalini, three belonging to *Anomalon*, one to *Barylypa*, one to *Exochilum*, and still another to *Labrorychus*.

LABRORYCHUS LATENS, sp. nov. (Fig. 51.)

Probably a female. Length 11.5 mm. Color apparently brownish or rufous with the dorsal parts of the thorax darker. Wings hyaline; head and

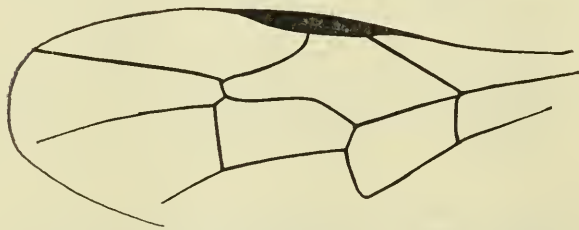


FIG. 51.—*Labrorychus latens*, sp. nov. Type.

thorax not particularly well preserved, the metathorax roughly rugose-reticulate, rather gently declivous behind. First two segments of abdomen long and slender, the following much enlarged and flattened and lighter in color than the basal

two. Wings short and broad, the stigma very slender, almost linear, but distinct; piceous; veins light fuscous. Marginal cell long, gradually

narrower toward the tip, the second section of the radius twice the length of the first; median and submedian cells of equal length or nearly so, the submedian being indistinctly the longer. Discocubital vein strongly curved inwardly at the base, without stump of a vein. Transverse cubitus less than one-half as long as the distance from it to the insertion of the second recurrent nervure; discoidal nervure broken just above the middle. Legs moderately stout, the posterior femora thickened; tarsi slender.

One specimen, seen in side view, with the front wings very finely preserved, but the body only moderately so.

Type.—No. 2250, M. C. Z., Florissant, Col. (No. 9290, S. H. Scudder Coll.).

In Szépligeti's arrangement of the Ophioninae (Genera Insectorum, fasc. 34) this species can be readily traced to this genus, with which it appears to agree in all essential particulars.

ANOMALON Gravenhorst.

Key to the Florissant species of Anomalon.

1. Submedian cell longer than the median by one-third the length of the transverse median nervure; second recurrent nervure inserted the length of the transverse cubitus beyond the tip of the cubitodiscoidal cell *A. confertum*, sp. nov.
- Submedian cell not or indistinctly longer than the median; recurrent nervure inserted nearer to the tip of the cubitodiscoidal cell 2.
2. First recurrent nervure received just before the basal third of the discocubital cell, wings infuscated, brownish. *A. deletum*, sp. nov.
- First recurrent nervure received nearer to the middle than to the basal third of the discocubital cell, wings hyaline. *A. excisum*, sp. nov.

ANOMALON CONFERTUM, sp. nov. (Fig. 52.)

Length 9–14 mm. Dark colored, the abdomen no lighter than the head and thorax. Wings hyaline. Head above polished, shining, but the projecting lower portion (probably the face and clypeus) is transversely rugose. Mesonotum shining, faintly shagreened, with plainly marked parapsidal furrows which meet in a deeply impressed transverse depression at the base of the scutellum; scutellum strongly elevated, pyramidal, strongly punctate. Metanotum with four equidistant longitudinal carinae that extend less than half

way to the tip, and one transverse carina near the base, the series enclosing six quadrate areas, the posterior series of which are open behind. Remainder of metathorax strongly, roughly and irregularly rugose. Abdomen slender and rather broad at the tip, no trace of ovipositor preserved. First abdominal segment as long as the metathorax, enlarged rather gradually at the apex;

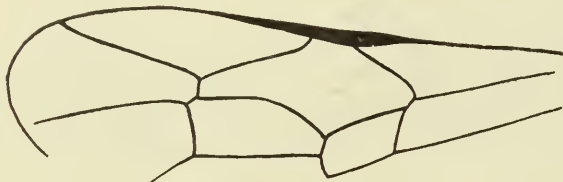


FIG. 52.—*Anomalon confertum*, sp. nov. Type.

second a very little longer; the two together as long as the entire thorax. Legs as usual, apparently entirely dark colored. Wings hyaline; stigma very narrow, reddish fuscous; veins fuscous. Submedian cell longer than the median by a distance equal

to one-third the length of the transverse median nervure. First recurrent nervure received a little beyond the basal third of the discocubital cell; the second, the length of the transverse cubitus beyond the tip of the cell. Discocubital vein bent distinctly at the middle, forming an angle of about 135° with the discoidal nervure.

Described from one specimen with its reverse.

Type.—Nos. 2251–2252, M. C. Z., Florissant, Col. (No. 8049–8766, S. H. Scudder Coll.).

There is also another specimen and its reverse, Nos. 2253–2254, M. C. Z., Florissant, Col. (Nos. 11,446–13,775, S. H. Scudder Coll.). which I believe belong to this species, although their color is more like that of the following species, the abdomen being reddish, lighter on the head and thorax. They are somewhat longer, 12 mm. in length, but the wing venation is identical.

ANOMALON EXCISUM, sp. nov. (Fig. 53.)

Female. Length 16 mm. Black or dark colored, with the flattened part of the abdomen lighter reddish brown. Antennae long, many jointed, involute toward the tips where the joints are about one-half wider than long; basal flagellar joints more nearly quadrate. Thorax higher than usual and short, less than twice as long as high when seen from the sides. Abdomen unusually slender at its base; first

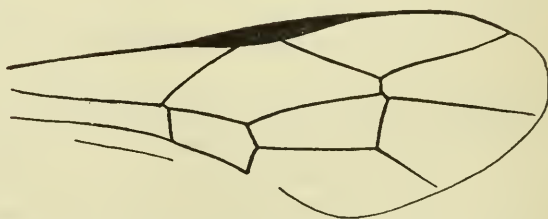


FIG. 53.—*Anomalon excisum*, sp. nov. Cotype.

segment rather suddenly enlarged at the tip, only a little more than one-half as long as the second, which is very gradually widened apically, until the tip is one-half wider than the base. Beyond this it is rather suddenly broadened. Legs stout; the posterior femora clavate, the thickened apical part twice as long as the slender basal portion and one-fourth as wide as the length of the femur. Posterior tibiae at tip three-fourths as thick as the broadest part of the femur. Metatarsus thickened. Wings hyaline; stigma and veins piceous, the former very slender; marginal cell as long as the discocubital; submedian cell very little longer than the median; discocubital nervure faintly arcuate inward, nearly straight; first recurrent nervure received a short distance before the middle of the discocubital cell; second, half the length of the transverse cubitus beyond its tip. Transverse median nervure of hind wing broken a short distance below the middle.

Type.—No. 2255, M. C. Z., Florissant, Col. (No. 8697 and 8765 (reverse) S. H. Scudder Coll.).

ANOMALON DELETUM, sp. nov.

Female. Length 8 mm. Ovipositor 2.5 mm. Black, the abdomen reddish brown; front and middle legs brownish yellow; wings with a strong brownish tinge. Antennae long and many jointed, but more nearly of an even thickness throughout than in recent species of the genus. They have apparently something over 40 joints and are not attenuated at the tip, the apical joint being as wide as the preceding ones and somewhat longer, the latter each about twice as long as thick; basal joints no thicker, but longer, three or four times as long as thick. Head smooth, mandibles brown. Mesonotum very finely sculptured, nearly smooth; metathorax not well preserved; first abdominal segment gradually enlarged to the tip, very finely longitudinally striated on its posterior half; second one-half longer than the first, but little broadened toward the tip; third enlarged, following as usual. Ovipositor longer than usual. Legs stout, the posterior tibiae thickened, with a long spur. Wings brownish, stigma and veins fuscous, the former narrow, lanceolate; discocubital cell distinctly longer than the marginal, its discoidal side arcuately curved inwardly; first recurrent nervure received just before the basal third of the cubitodiscoidal cell; second, one-third the length of the transverse cubitus beyond its tip; submedian cell not or indistinctly longer than the median.

One specimen, well preserved in lateral aspect.

Type.—No. 2256, M. C. Z., Florissant, Col. (No. 11,481, S. H. Scudder Coll.).

ANOMALON sp.

There is a smaller specimen, No. 2257 M. C. Z., Florissant, Col. (No. 9070, S. H. Scudder Coll.) belonging to this genus or to one closely related, apparently different from the ones described, but too poorly preserved to be identified with certainty. It is black, with a reddish abdomen and measures only 5.5 mm. in length.

BARYLYPA PRIMIGENA, sp. nov.

Female. Length 8 mm. Dark colored, the abdomen unicolored; more brownish. Wings slightly infuscated. Antennae long setaceous, reaching to the tip of the petiole of the abdomen. Thorax gently sloping behind, the metanotum rugulose near the tip. Parapsidal furrows present. Abdomen strongly compressed apically, suddenly enlarged from the base of the third segment; fifth and sixth segments higher than the height of the thorax when seen in profile. Ovipositor projecting to a distance equal to the length of the sixth abdominal segment. Petiole and second segment both slender, of about equal length, the first but little swollen at the apex, the second gradually broadened, third a little longer than high at the tip; fourth similarly shaped, but nearly three times as high at the tip as the third; the next two a little higher, about equal; seventh not so high. Posterior legs rather stout, the femora slightly clavate, no broader than the tibiae. Metatarsus thickened. Wings slightly, but distinctly infuscated, stigma moderately narrow, lanceolate. Venation not very well preserved, but the second recurrent nervure appears to be very nearly interstitial with the transverse cubitus; submedian cell considerably longer than the median.

Type.—No. 2258, M. C. Z., Florissant, Col. (No. 13,934, S. H. Scudder Coll.).

Although the wing venation of the specimen is somewhat obscure, the body has the habitus of *Barylypa* and all characters discernible point to its location in this genus.

EXOCHILUM INUSITATUM, sp. nov.

Female. Length 8–9 mm. Dark colored, the abdomen beyond the second segment more or less brownish or dark yellow, especially below. Face and four anterior legs also paler. Antennae short and rather stout, scarcely over one-half the length of the body; with about 32 joints and not much attenuated at the tips. Joints near the base of the flagellum fully twice as long as thick; those near the middle quadrate, and those near the apex distinctly longer than wide. Mesonotum and mesopleurae smooth and shining.

Metanotum coarsely rugose-reticulate, its tip produced beyond the insertion of the hind coxae. Abdominal petiole as long as the slope of the metathorax, rather suddenly widened above at the tip; second segment one-fourth longer than the first, slender and very gradually widened to the tip where it is one-fourth as high as long; third three-fifths as long as the second and twice as high at the tip; third a little shorter than either the fourth, fifth or sixth which are subequal. Ovipositor nearly as long as the petiole. Hind legs long as is usual in the genus, the tibia as long as the trochanters and femur together; metatarsus twice as long as the second joint. Wings distinctly infuscated, fulvous. Marginal cell long, about three and one-half times as long as its greatest width, its second section twice as long as the first; transverse cubitus long, distinct; nervure at tip of third discoidal cell broken at its middle, its parts meeting at a distinct though very obtuse angle.

Type.—No. 2259, M. C. Z., Florissant, Col. (No. 1334, S. H. Scudder Coll.).

This is a rather puzzling form on account of its antennae which are shorter, with fewer joints, and not so distinctly setaceous as those of recent forms belonging to this tribe. However, it seems to agree with *Exochilum* in other respects and I hesitate to erect a new genus for its reception.

Aside from the doubtful *Ophion* or *Campoplex* discovered by Sordelli ('82) in the Quaternary at Pianico, Italy, no fossil members of the *Campoplegini* have been so far described. I have found two genera among the Florissant collection, one apparently undescribed, represented by two species, and the other *Limnerium sensu lato*, a very widely distributed recent genus, represented by five species.

HIATENSOR, gen. nov.

Body elongate, the metathorax produced posteriorly between the insertion of the posterior coxae into the neck-shaped tip characteristic of the *Anomalini* and *Campoplegini*. Abdomen shaped as in *Campoplex*; clavate, the first and second segments forming a long pedicel which slightly exceeds the length of the remainder of the abdomen in the type species, but is shorter in the second species. Hind legs exceedingly elongate, the tips of the femora extending considerably beyond the tip of the abdomen. The coxae are not particularly elongate, but the trochanters, femora, and tibiae as well as the tarsi are much longer than usual; the femora are strongly clavate, thickened on their apical one-half, being four or five times as thick at the apical third as at the base. Tibiae as long as the femora, with a short spur; tarsi slender, not at all thickened. Wing with a very slender, nearly linear stigma; areolet wanting, the second transverse cubitus long; recurrent nervure received just beyond it; first recurrent nervure received before the basal third of the discocubital cell; submedian cell slightly longer than the median.

Type.—*H. semirutus*, sp. nov.

The type species is evidently a true campoplegine, but I cannot reconcile its peculiar habitus with any recent genus, and I believe it worthy of generic rank.

HIATENSOR SEMIRUTUS, sp. nov. (Figs. 54, 55.)

Female? Length about 9 mm. Apparently brown, with the apical portion of the hind femora and the apical part of the abdomen darker. Head not preserved. Mesothorax smooth; metathorax regularly coarsely rugulose. Abdominal petiole as long as the slope of the metathorax, swollen only slightly at the tip, the second segment about a quarter longer and but little thicker at apex than at base; remaining segments forming an ovate body. The tip

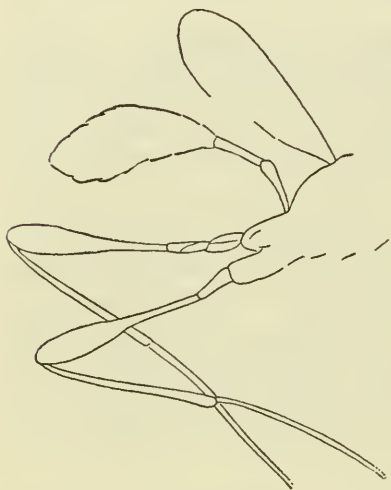


FIG. 54.



FIG. 55.

FIG. 54.—*Hiatensor semirutus*, gen. et sp. nov. Profile of type; FIG. 55.—Wing.

of the abdomen is pointed and I believe the specimen is a female, although no ovipositor can be distinctly seen. Wings hyaline, stigma piceous; veins reddish fuscous; marginal cell long and pointed; both sections of the radius straight; discocubital cell twice as long as high, its limiting nervures nearly straight, except the basal vein which is slightly curved.

Described from one specimen well preserved, except the head which is chipped off from the stone.

Type.—No. 2260, M. C. Z., Florissant, Col. (No. 8396, S. H. Scudder Coll.).

HIATENSOR FUNDITUS, sp. nov. (Fig. 56.)

Female. Length 8 mm. Head and thorax black above, the mouthparts and the lower part of the thorax, except the hind coxae, yellowish. Abdomen black, the apical four segments more or less reddish brown on their basal portions. Hind legs black; anterior and middle pairs yellowish, their tarsi darker apically; wings hyaline. Antennae long slender, and of even thickness throughout; most of the joints about three times as long as wide. Mesonotum shining; metathorax coarsely and regularly rugose reticulate. First abdominal segment as long as the metathorax, very gradually swollen toward the tip; second as long as the first; body of abdomen gradually enlarged behind, compressed; third segment much enlarged behind, three-fourths as long as the second and nearly as high behind as it is long; fourth and fifth widening; sixth and seventh narrowing slightly, the latter rounded behind; ovipositor short, one-half as long as the abdominal petiole and flattened blade-like. Posterior legs very long, but shorter than in the preceding species, the apex of the femora, reaching just about to the tip of the abdomen, the femora clavate, the thickening beginning just beyond the middle, the thickest part four times as thick as the slender basal portion. Wings with narrow stigma, the marginal cell narrow; first section of the radius hardly longer than the basal vein; first recurrent nervure received just beyond the basal one-fourth of the discocubital cell; second recurrent nervure received just beyond the first transverse cubitus.



FIG. 56.— *Hiator funditus*, sp. nov.
Type.

Type.— Nos. 2261–2262, M. C. Z., Florissant, Col. (No. 408 and 7167 (reverse), S. H. Scudder Coll.).

This resembles *H. semirutus* in the extremely elongate and clavate form of the hind femora, but differs by the narrower marginal cell and shorter second abdominal segment; otherwise they are very similar and I think undoubtedly congeneric.

LIMNERIUM Holmgren.

Key to the Florissant species of Limnerium.

1. Areolet either petiolate or touching the radius in a point with its upper angle just attaining the radius 2.
- Arolet distinctly sessile above, i. e. with a distinct radial side.

L. vetustum, sp. nov.

2. Abdomen strongly petiolate as usual in the genus 3.
 Abdomen only subpetiolate; recalling to some extent the form
 which it assumes in certain species of *Lampronota*; areolet
 distinctly petiolate *L. plenum*, sp. nov.
3. Areolet small, plainly petiolate, the petiole one-half as long as the
 cubitodiscoidal side of the areolet . . . *L. depositum*, sp. nov.
 Areolet large, touching the radius in a point 4.
4. Abdomen slender, the second segment nearly as long as the petiole.
L. consuetum, sp. nov.
 Abdomen shorter and stouter, the second segment only a little
 more than one-half the length of the petiole
L. tectum, sp. nov.

LIMNERIUM VETUSTUM, sp. nov.

Female. Length 6 mm. Body dark, probably black, the antennae more brownish; abdomen higher below and toward the apex; posterior coxae and legs reddish brown; the femora blackened on the apical one-half, slender and only imperceptibly thickened before the apex; surface of mesonotum smooth; metanotum with all three lateral and three pleural areas separated; ovipositor dark, as long as the abdomen from the tip of the second segment. Wings somewhat infuscated, with a brownish tinge; veins fuscous, stigma lanceolate; first section of the radius nearly one-half as long as the second, the two forming a very oblique angle; areolet large, with a distinct radial side.

Described from two specimens.

Type.—No. 2263, M. C. Z., Florissant, Col. (No. 11,459, S. H. Scudder Coll.). Also No. 2264, M. C. Z., Florissant, Col. (No. 13,847, S. H. Scudder Coll.).

There is another specimen, No. 2265, M. C. Z., Florissant, Col. (No. 11,906, S. H. Scudder Coll.) which is probably the same species. It has the hind femora and tibiae black, but otherwise so far as I can make out is identical, although it is not so well preserved as might be desired.

This resembles *L. tectum*, but has more slender legs, the posterior femora being not nearly so thick, with nearly parallel sides, whereas in *L. tectum* they are arcuately thickened at the middle both above and below. The areolet is also much broader above, resting with a distinct side along the radial vein.

LIMNERIUM PLENUM, sp. nov. (Fig. 57.)

Female. Length 5.5 mm. Black, the legs brownish testaceous, the tips of the femora, tips of the tibiae and tarsi of posterior pair blackened. Abdomen dark, lighter toward the tip and on the venter; antennae slender, many jointed (about 30-35), the joints toward the middle one-half longer than wide, and only slightly thicker than the apical joints which are distinctly longer than wide. Surface of thorax rougher than usual in the genus; metathorax completely areolated, the basal pleural and second pleural areas completely separated; basally the metanotum is nearly smooth but apically it is very distinctly rugose-reticulate. Abdomen much shorter and stouter than usual; first seg-



FIG. 57.—*Limnerium plenum*, sp. nov. Type.

ment short, not so long as the posterior slope of the metathorax; second segment a little shorter than the first; third to sixth about equal in length; terminal segment longer. Ovipositor issuing from the base of the fifth segment, from its extreme base to tip nearly as long as the abdomen exclusive of the petiole. Wings yellowish hyaline; stigma fuscous; veins pale brown; stigma rather broad, one-half as wide as the marginal cell; second section of the radius twice as long as the first; areolet small, triangular, distinctly but shortly petiolate above; submedian cell slightly but plainly longer than the median.

Described from one specimen with its reverse, both quite well preserved, from Station No. 17, collected by Mrs. W. P. Cockerell.

No. A77, type in the Amer. Mus. Nat. Hist. This species could not be referred to *Limnerium*, *sensu stricto* if living, but as I can place it nowhere else from a study of the material at hand, it has seemed advisable to place it here, where it will no doubt be sought if additional specimens are secured in the future.

LIMNERIUM DEPOSITUM, sp. nov. (Fig. 58.)

Female. Length 6 mm. Black, the abdomen stained with rufous as follows: a small spot on the side of the second segment near the tip; third segment at the base and below on the sides. Fourth to sixth piceous above, rufous anteriorly and below on the sides. Four anterior legs pale, the posterior pair blackish with fuscous tarsi. Surface of head, thorax and pleurae coriaceous or minutely punctulate. Antennae long and slender, with probably somewhat over 30 joints; joints near the middle of the flagellum one and one-half times as long as thick, much thicker than those toward the apex which are quadrate. Metathorax areolated, but apparently the pleural areas are not separated, its surface finely punctulate. Abdomen of the usual form for the genus, the



FIG. 58.— *Limnerium depositum*, sp. nov. Type.

petiole clavately thickened, a trifle longer than the posterior slope of the metathorax; second segment two-thirds as long as the first; third shorter and much wider in lateral aspect. Ovipositor originating at the base of the fifth segment, from its extreme base to tip nearly as long as the abdomen exclusive of the petiole and second segment. Wings hyaline; stigma piceous, oval lanceolate; veins brown; marginal cell at its widest part two and one-half times as wide as the stigma; second segment of the radius straight, twice as long as the first; areolet of moderate size, with a long petiole above, which is over one-half as long as the cubitodiscoidal side of the areolet; median and submedian cells of equal length.

One specimen, No. A58, collected by Mr. S. A. Rohwer at Station 14. Type in the Amer. Mus. Nat. Hist.

This is a very typical species of *Limnerium* in all respects and appears to be a close relative of some living forms.

LIMNERIUM CONSUETUM, sp. nov. (Fig. 59.)

Female. Length 5 mm. Dark colored, reddish on the abdomen below from the third segment to the tip; legs yellowish, the posterior pair darker. Antennae rather short, slender, particularly near the base of the flagellum. The number of joints is not plain, but there are apparently fewer than in the other species here described. Surface of thorax roughly shagreened or punctulate, the metanotum arcuately rounded behind and not completely areolated although the pleural areas are strongly marked and the lateral ones indistinctly separated. Abdomen slender at the base, but strongly compressed apically, its surface coriaceous. Petiole as long as the entire slope of the metathorax, slender at the base and clavately thickened apically; second segment very long, a little longer than the first; third shorter, but still a little longer than its height at the tip. Following segments strongly compressed. Ovipositor issuing from the base of the sixth segment, as long as the abdomen exclusive of the first three segments. Wings hyaline; stigma dark brown and veins pale brown; stigma rather slender, two-fifths as wide as the marginal cell which is somewhat broader than in the other species. Areolet triangular, large, its upper point touching the radius; second section of the radius about twice as long as the first. Median and submedian cells of approximately equal length.



FIG. 59.—*Limnerium consuetum*, sp. nov. Type.

One specimen, No. A112, collected at Station 14 and sent by Professor Cockerell. Type in the Amer. Mus. Nat. Hist.

This is a typical species of the genus.

LIMNERIUM TECTUM, sp. nov. (Fig. 60.)

Female. Length 5.5 mm. Black, the third and following segments reddish brown below; wings hyaline. Antennae about 28-jointed, indistinctly thicker

toward the middle of the flagellum where the joints are about twice as long as thick; joints near the apex shorter and not quite so thick. Seen from the side the upper surface of the thorax is evenly arcuate. Mesonotum with the coriaceous sculpture characteristic of recent species of *Limnerium*. Metanotum with the first and second lateral areas separate; the first and second pleural



FIG. 60.— *Limnerium tectum*, sp. nov. Type.

areas apparently confluent, but the third separated from the second. Abdomen of the usual form; the petiole gradually thickened, then slightly narrowed just before the tip; three times as long as high. Ovipositor as long as the abdomen

from the tip of the second segment. Legs stout, especially the hind femora; hind tarsi apparently pale at the base. Stigma and veins piceous; stigma oval-lanceolate, rather narrow; marginal cell wide, the first section of the radius a little more than one-third the length of the second. Areolet large, oblique, rhomboidal, narrowed above to a point but not petiolate.

Type.— No. 2266, M. C. Z., Florissant, Col. (No. 2296, S. H. Scudder Coll.).

This is a typical species of *Limnerium*, quite similar to some of the living forms of this very extensive genus.

No fossil representatives of the Paniscini have previously been discovered, but I have found species belonging to two living genera, *Absyrtus* and *Parabates* in the present collection, and possibly a species of a third, *Opheltes*.

ABSYRTUS DECREPITUS, sp. nov. (Fig. 61.)

Sex? (probably a female). Length 7.25 mm. Black, the abdomen beyond the first segment brown with pale bands on the bases of the segments. Antennae scarcely preserved, but they were probably quite stout and with the joints near the middle of the flagellum quadrate or slightly longer than thick. Mesonotum and pleurae smooth; metathorax areolated, at least near the tip. Abdomen long and of nearly even width beyond the first segment which is twice as long as broad and finely longitudinally rugulose; second rapidly widened, as long as broad at the tip; third to sixth



FIG. 61.— *Absyrtus decrepitus*, sp. nov. Type.

gradually shorter, seventh and eighth more rapidly so. Legs, as far as preserved, pale brown. Wings hyaline, stigma and veins light brown, the former rather broadly ovate. Radial cell short and broad, the first section of the radius fully two-thirds as long as the second; discocubital vein composed of two straight segments, which meet sharply at almost a right angle; submedian cell considerably longer than the median; discoidal nervure broken much below the middle; areolet rather small, quite indistinctly closed; very obliquely rhomboidal, receiving the recurrent nervure near the tip.

Type.—No. 2268, M. C. Z., Florissant, Col. (No. 6876, S. H. Scudder Coll.).

One specimen, not very well preserved, but extremely characteristic on account of the angular course of the discocubital vein. This peculiarity and its general appearance make me place it here.

PARABATES MEMORIALIS, sp. nov. (Fig. 62.)

Probably a female. Length 17 mm. Dark colored, the abdomen conspicuously banded. Wings distinctly infuscated. Head apparently strongly transverse, the antennae stout, but very much tapered apically; joints near the base of the flagellum approximately as long as thick, those toward the apex becoming very little shorter in proportion to their width. Thorax rather shining, its surface punctulate although faintly so. Metathorax apparently with a few carinae, but not completely areolated. Abdomen large and stout, much compressed, club-shaped apically and subpetiolate at the base; first to fifth segments pale colored, with dark apical cross bands; apex of abdomen dark. Ovipositor not preserved although the specimen is probably a female. Legs, especially the posterior pair, long and stout; dark colored, the tarsi pale. Wings ample, quite distinctly infuscated;

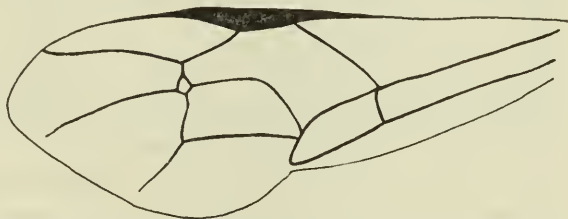


FIG. 62.—*Parabates memorialis*, sp. nov. Type.

stigma and veins fuscous, the former lanceolate in form. Marginal cell long and narrow; second section of the radius arcuate inwardly and then recurved at its tip, twice the length of the first; submedian cell very slightly longer than the median; cubitodiscoidal vein very indistinctly broken near the middle, with a slight trace of a stump of a vein at this point; areolet small, four-sided, the upper two sides the longest, petiolate above, the petiole as long as the height of the areolet.

One specimen, collected by Professor Cockerell, no station indicated

on the slab. No. B3, type in the Museum of the University of Colorado.

This is a typical paniscine which looks very much like our living North American species of *Opheltes* in habitus and color. Structurally it comes closer to *Parabates* in which genus I have placed it.

OPHELTES Holmgren.

There is a specimen, No. 2375, M. C. Z., Florissant, Col. (No. 4680, S. H. Scudder Coll.) which appears to belong to *Opheltes* or some closely allied genus. As it is not very well preserved I have not described it. The size is rather small, about 8 mm.

The tribe Banchini is represented in the collection by one species referable to the genus *Lapton* and a second one belonging to *Exetastes*.

LAPTON DAEMON, sp. nov.

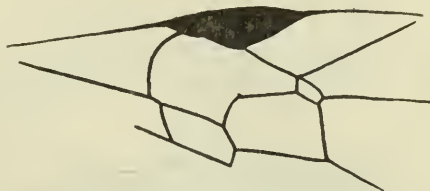
Sex? Length 9 mm. Body dark colored, the abdomen beyond the base of the second segment more or less ferruginous; four anterior legs fusco-ferruginous; hind pair darker, with honey-yellow trochanters. Antennae slender, the basal joints very long, the first flagellar joint being about five and the second about four times as long as wide; following growing shorter, those toward the apex becoming quadrate. Thorax very finely punctulate or shagreened; metanotum completely areolated. Abdomen long and slender, gradually thickened apically; first segment slightly but evenly curved, as long as the metanotum; its spiracles placed at about the basal third; second segment nearly as long as the first and stouter; following stouter, all more or less distinctly blackened basally. Legs long and slender, first three joints of posterior tarsus about as long as the tibia. Wings hyaline; stigma and veins pale fuscous. Stigma lanceolate. Marginal cell long, the first section of the radius less than one-half as long as the second. Discocubital cell rather long, the discocubital vein slightly and evenly curved; transverse cubitus long and strongly oblique, its base being nearer the base of the wing; recurrent nervure received far beyond it, also strongly oblique, but in an opposite sense; second discoidal cell broad at the base; median and submedian cells seemingly of equal length; transverse median vein in hind wing apparently broken near the middle.

Type.—No. 2269, M. C. Z., Florissant, Col. (No. 8148, S. H. Scudder Coll.).

This species most surely belongs to the Banchini and apparently comes closest to *Lapton*, although unfortunately the mouthparts and the transverse median vein of the front wings are not preserved.

EXETASTES INVETERATUS, sp. nov. (Fig. 63.)

Female. Length 7 mm. Very dark colored, the abdomen except at the base much lighter. Rather stout, the head thin antero-posteriorly. Antennae long and slender, brown, the joints of the flagellum toward the base about twice as long as wide. Mesonotum minutely punctulate; metathorax not areolated, although there are some slight irregular indications of carinae. Abdomen stout, contracted sharply at the base, but not petiolate; first segment three-fourths as long as the second; third and fourth together as long as the second, fifth and sixth smaller. Ovipositor two-thirds as long as the abdomen, black. The abdomen is smooth except the first segment which is quite distinctly although delicately punctured. Wings hyaline; stigma and veins fuscous; areolet large, quadrangular, oblique, subsessile above; marginal cell broad, sharply pointed apically, the second section of the radius about two and one-half times as long as the first; stigma large, subtriangular; discocubital vein sharply bent, but without trace of a stump of a vein; submedian cell considerably longer than the median.

FIG. 63.—*Exetastes inveteratus*, sp. nov. Type.

Type.—No. 2270, M. C. Z., Florissant, Col. (No. 7512, S. H. Scudder Coll.).

This species resembles in superficial appearance some of the species of *Mesochorus* described in the present paper, but differs by the much more sessile attachment of the abdomen and by the convex, non-areolated metathorax.

A considerable series of species occur at Florissant, seven in all, which I have placed provisionally in the genus *Mesochorus* although they are not very typical. In all of them the areolet is much smaller than in recent forms, but otherwise they are quite similar.

A very typical species of *Mesochorus* has been described by Scudder ('90) from the Oligocene of Green River, Wyoming, but by him made the type of a new genus, *Lithotorus*. Brischke ('86) also records the probable presence of *Mesochorus* in Baltic Amber.

MESOCHORUS Gravenhorst.

Key to the Florissant species of Mesochorus.

1. Areolet large, distinctly sessile above 2.
- Arolet petiolated or subpetiolated above; last section of the radius
 not recurved (i. e. convex on side toward costal margin of wing). 3.

2. Large species, length 8.5 mm., last section of the radius recurved.
M. lapideus, sp. nov.
 Smaller, less than 6 mm., last section of the radius straight.
M. carceratus, sp. nov.
3. Petiole of areolet long, nearly as long as the inner side of the areolet, stigma narrow *M. abolitus*, sp. nov.
 Petiole shorter or obsolete 4.
4. Stigma slender, lanceolate 5.
 Stigma ovate or broadly ovate 6.
5. Areolet distinctly petiolate, the petiole distinct.
M. revocatus, sp. nov.
 Petiole obsolete 7.
6. First section of the radius much longer than the thickness of the stigma *M. terrosus*, sp. nov.
 First section of the radius not or scarcely longer than the thickness of the stigma *M. cataclysmi*, sp. nov.
7. Areolet regularly rhombic *M. aboriginalis*, sp. nov.
 Areolet rhomboidal, distinctly oblique. *M. dormitorius*, sp. nov.

MESOCHORUS LAPIDEUS, sp. nov. (Fig. 64.)

Female. Length about 8.5 mm. Brown, varied with darker; wings hyaline. Head probably black; antennae fuscous, about 32-jointed, rather stout, the basal flagellar joints about three times as long as thick; those toward the apex quadrate. Thorax brownish or blackish, varied on the pleurae with lighter. Metanotum areolated, the basal and middle lateral areas separated,

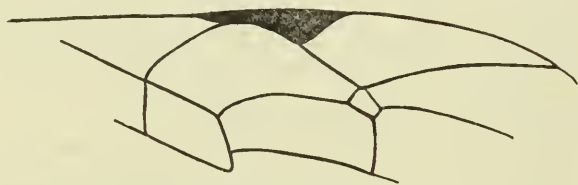


FIG. 64.—*Mesochorus lapideus*, sp. nov. Type.

but indistinctly so. Abdomen brown or ferruginous, the petiole and spot at base of second segment black. Ovipositor short, slightly curved downward at the tip. Coxae and legs black, tarsi light brown, with darker tips.

Marginal cell long and narrow, the last section of the radius curved inwardly so that it bulges into the marginal cell; fully three times as long as the first section. Stigma lanceolate, but moderately broad. Areolet large, obliquely rhomboidal, quite broadly sessile above; submedian cell longer than the median.

Type.—No. 2276, M. C. Z., Florissant, Col. (No. 11,421, S. H. Scudder Coll.).

MESOCHORUS CARCERATUS, sp. nov. (Fig. 65.)

Female. Length 6 mm. Black, the abdomen except at the base, more or less brownish or ferruginous. Antennae piceous, short and stout, the basal flagellar joints only about two times as long as thick; those beyond the middle quadrate. Metanotum regularly areolated, the basal and middle lateral areas completely separated. Basal segment of abdomen black; the second segment pale ferruginous; following growing gradually darker to the tip which is fuscous. Ovipositor long, nearly as long as the body, but this seems to be due in great part to pressure, all the terminal segments being strongly extruded. Legs black, the knees lighter. Wings subhyaline, stigma and veins piceous; the former rather broad, subtriangular; marginal cell short, the radius sharply angled, its second section straight, twice as long as the first. Areolet rather large, obliquely rhomboidal and broadly sessile above. Submedian cell very slightly longer than the median; discocubital cell shorter than usual.



FIG. 65.—*Mesochorus carceratus*, sp. nov. Type.

Described from one specimen sent by Professor Cockerell, No. A15. Type in the Amer. Mus. Nat. Hist.

MESOCHORUS ABOLITUS, sp. nov. (Fig. 66.)

FIG. 66.—*Mesochorus abolitus*, sp. nov. Type.

Sex? Length probably 8 or 10 mm. A specimen only in part preserved, but with both anterior wings in good condition. The color of the head and thorax is dark, with the abdomen lighter and distinctly banded with blackish on each segment anteriorly. Antennae rather long, the joints toward the apex of the flagellum broad, quadrate or slightly transverse. The wings are hyaline, with fuscous stigma and veins; stigma lanceolate, but nevertheless rather broad, with its inferior margin distinctly angled; marginal cell long, the second section of the radius straight, less than twice as long as the first. Areolet with a long petiole, obliquely rhomboidal; discocubital cell long; submedian cell considerably longer than the median.

Described from one specimen sent by Professor Cockerell, No. A66. Type in the Amer. Mus. Nat. Hist.

MESOCHORUS REVOCATUS, sp. nov. (Fig. 67.)

Length probably about 8 mm., although only part of the head and thorax and the wings are preserved. The metanotum is regularly areolated, with the



FIG. 67.—*Mesochorus revocatus*, sp. nov. Type.

basal and middle lateral areas separated. The wings are hyaline, with fuscous veins and stigma. Stigma long, lanceolate. Marginal cell moderately long, the second section of the radius straight, twice as long as the first; areolet moderately large, with a long petiole above; obliquely rhomboidal in form; discocubital cell

short, the submedian cell scarcely longer than the median. General color of body black.

Type.—No. 2277, M. C. Z., Florissant, Col. (No. 14,494, S. H. Scudder Coll.).

MESOCHORUS TERROSUS, sp. nov.

Female. Length 6.5 mm. Black; antennae and abdomen beyond the second segment, brown. Head small, antennae long and slender, the basal flagellar joints four or five times as long as thick. Metanotum regularly areolated, the basal and middle lateral areas completely separated. Abdomen clavate, the petiole stout, curved above but straight below, as long on its dorsal surface as the second segment; third to sixth segments gradually higher dorsoventrally, but of about equal length. Ovipositor distinctly exerted, its sheaths broad. Legs slender, brown or dark ferruginous, the tips of the hind tibiae and the hind tarsi blackish. Wings hyaline; stigma and veins ferruginous; marginal cell long, its second section straight, more than twice as long as the first which is curved and longer than the thickness of the stigma. Areolet moderately large; obliquely rhomboidal, subpetiolate above; discocubital cell short, the discocubital nervure very sharply bent downward basally; submedian cell very slightly longer than the median.

Type.—No. 2278, M. C. Z., Florissant, Col. (S. H. Scudder Coll.).

MESOCHORUS CATACLYSMI, sp. nov. (Fig. 68.)

Female. Length 5–7 mm. More or less brownish, the head and thorax darker and the abdomen darker on the apical parts of the segments. Legs

light brown or yellow; hind pair, except coxae, trochanters and base of tibiae blackish. Antennae rather stout, imperceptibly thickened toward the tips; basal joints of flagellum about three times as long as thick, the apical ones quadrate; they are about 23-jointed. Mesonotum quite distinctly punctulate; metanotum regularly and completely areolated. Abdomen clavate; petiole long and slightly curved both above and below, fully one-fourth longer than the second segment; third to fifth growing higher, but shorter. Ovipositor as long as the first and second abdominal segments together. Wings small, hyaline, with fusco-ferruginous stigma and veins. Stigma very broad, triangular. Marginal cell short and broad, the second section of the radius straight, very oblique, and fully four times as long as the first which is no longer than the thickness of the stigma; discocubital cell short, the discocubital vein strongly but evenly curved; median and submedian cells of equal length. Areolet rather small, subsessile, long oblique, but tending to be rectangular. Legs slender.

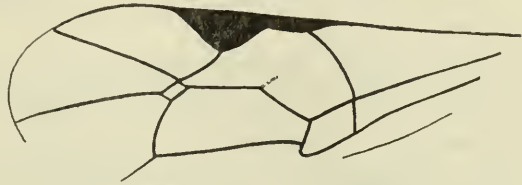


FIG. 68.—*Mesochorus cataclysmi*, sp. nov.

Type.—No. 2279, M. C. Z., Florissant, Col. (No. 13,788, S. H. Scudder Coll.). In all there are four specimens before me; the type, Nos. 2280–2281, M. C. Z., Florissant, Col., Nos. 9678 and 8945, (Fig. 68) Scudder Coll., and No. A67 collected by Professor Cockerell at Station 17.

MESOCHORUS ABORIGINALIS, sp. nov. (Fig. 69.)

Female. Length 5–6 mm. Black, or dark colored, the abdomen beyond the base of the second segment reddish brown. Legs so far as preserved brownish beyond the coxae. Head seen in lateral aspect smooth, but seemingly not polished; mesonotum like the head, but with a few transverse



FIG. 69.—*Mesochorus aboriginalis*, sp. nov.
Type.

wrinkles anteriorly; pleurae delicately sculptured, more or less obliquely or irregularly wrinkled. Metathorax areolated, the areas smooth, slightly rugose apically. Abdomen about one and one-half times as long as the thorax, petiolate, the petiole three-fourths

the length of the posterior slope of the metathorax, gradually and slightly thickened apically; remainder of abdomen subclavate, the second segment three-fourths the length of the first; third only two-thirds the length of the second; fourth and fifth gradually shorter. Ovipositor about as long as the

first and second abdominal segments combined, very stout and blunt at the apex. Wings hyaline, veins and stigma fuscous. Stigma long, narrowly lanceolate, the radius originating beyond its middle; marginal cell moderately long, acute at the tip, the second section of the radius twice as long as the first. Submedian cell distinctly longer than the median. Areolet large, regularly rhombic; discocubital and basal veins strongly arcuate.

Type.—No. 2282, M. C. Z., Florissant, Col. (No. 6325, S. H. Scudder Coll.).

This species is more like recent ones than the foregoing ones on account of the large rhombic areolet, the very typical abdomen and ovipositor. It appears to be more like *Mesochorus* (*Lithotorus*) *cressoni* Scudder from Green River, Wyoming, than any of the other Florissant species.

MESOCHORUS DORMITORIUS, sp. nov. (Fig. 70.)

Female. Length 6.5 mm. Black; prothorax, line before tegulae, tegulae and legs including all coxae yellowish or reddish brown; the tibiae and tarsi of the hind pair much darker. Abdomen below toward the apex brownish. Antennae slender, with something over 30 joints, the ones near the apex but little longer than thick; those near the base three or four times as long as thick, the first flagellar still longer. Mesonotum finely shagreened; meta-

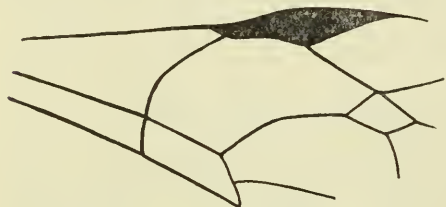


FIG. 70.—*Mesochorus dormitorius*, sp. nov.

thorax completely and distinctly areolated. Abdominal petiole seen from the side a little shorter than the posterior face of the metathorax, weakly arcuate and thickened apically from near the base. Apical abdominal segments strongly compressed, but this is probably in part due to flattening within the rock. Ovipositor at least as long as the first two abdominal segments, and probably longer as its apex is lost; its sheaths but slightly flattened. Wings slightly infuscated. Stigma piceous; veins fuscous; marginal cell about three and one-half times as long as its greatest height; first section of the radius slightly less than one-half as long as the second; areolet large, obliquely rhomboidal, the first transverse cubitus two-fifths as long as the first section of the radius. Stigma not especially broad, more lanceolate.

Type.—Nos. 2283–2284, M. C. Z., Florissant, Col. (No. 13,778 and 13,826 (reverse), S. H. Scudder Coll.). The Scudder Collection also contains a specimen, Fig. 70 (No. 11,970, M. C. Z., 2265) which I refer to this species.

A typical *Mesochorus*, except that the abdomen appears to be more flattened than usual near the tip.

Of the numerous genera included in the *Porizonini*, only one, *Porizon*, has been found fossil, one species by Brischke ('86) in Baltic Amber, and a second among the present material.

PORIZON EXSECTUS, sp. nov. (Fig. 71.)

Length 6 mm. Head and thorax nearly black, abdomen brownish yellow, the petiole fuscous. Legs pale brown, the hind pair somewhat darker. Wings hyaline. Head and thorax very finely punctulate, the metanotum areolated; petiole of abdomen one-half as long as the thorax, tip of abdomen not preserved. Wings with a large, almost triangular stigma; first section of the radius distinctly less than half as long as the second which meets it at a right angle; transverse cubitus oblique, almost a continuation of the first section of the radius, interstitial with the recurrent nervure below; median and submedian cells of equal length; marginal as long as the discocubital cell.

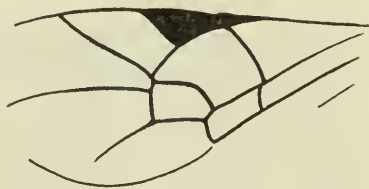


FIG. 71.—*Porizon exsectus*, sp. nov. Type.

Type.—No. 2286, M. C. Z., Florissant, Col. (No. 3223, S. H. Scudder Coll. The specimen shows the head, thorax, both front wings, and the basal part of the abdomen, and there can be no doubt that it is a true *Porizon*.

So far no representatives of the *Pristomerini* have been found in a fossil state.

DEMOPHORUS ANTIQUUS, sp. nov. (Fig. 72.)

Female. Length 6.5–7 mm. Color probably dark or brownish, the tips of the hind femora darker and the head black. Antennae long, slender, involute, of equal thickness throughout; more than 30-jointed, the joints of the apical portion about quadrate, those nearer the base of the flagellum longer. Thorax almost evenly arcuate above when seen from the side; the metathorax rather sharply declivous behind, regularly and completely areolated. Abdomen compressed strongly toward the apex; petiole long, slender, straight, but little thickened on its apical three-fifths; second segment about as long as the first, twice as high at its tip as at the base. Legs stout, especially the posterior femora, which are much thickened, but apparently without any teeth below near the apex. Wings hyaline or nearly so, stigma and veins piceous. Stigma

large, broadly triangular, emitting the radius somewhat beyond the middle. Costal margin thickened at the insertion of the basal nervure; first and second



FIG. 72.—*Demophorus antiquus*, sp. nov.
Type.

sections of the radius meeting at an oblique angle; both straight, the second three times the length of the first. Areolet rather small, oblique, in the form of an elongate, inverted trapezoid; median and submedian cells of equal length.

Type.—No. 2287, M. C. Z., Florissant, Col. (No. 13,869,

S. H. Scudder Coll.). Also No. 2288, M. C. Z., Florissant Col. (No. 11,699, S. H. Scudder Coll.).

This seems to belong to Thomson's genus *Demophorus*, known hitherto by two recent species from Europe. The thickened hind femora suggest a possible relationship with *Pristomerus* and its allies, but I can detect no teeth on them, upon which character the recognition of these genera principally depends.

ALYSIIDAE.

Up to the present time this family has not been recognized in the fossil state, but the present collections contain two species which undoubtedly belong here.

Although easily distinguished by their peculiarly attached mandibles from the Braconidae, particularly the subfamily Aphidiinae which they resemble in venation, members of the family are not easily recognizable in the fossil state. This is due to the fact that the form and insertion of the mandibles are usually very difficult to make out unless the preservation of the specimens is unusually good. Both of the new species belong to the genus *Alysia sensu lato*.

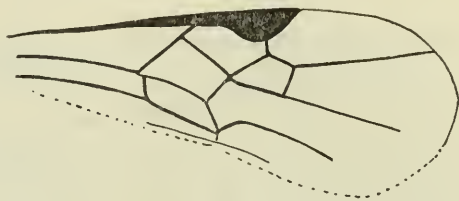
ALYSIA Latreille.

Key to the Florissant species of Alysia.

1. First section of the radius less than one-half as long as the second;
third section straight *A. petrina*, sp. nov.
- First section of the radius considerably more than one-half as
long as the second; third section distinctly arcuate.
A. exigua, sp. nov.

ALYSIA PETRINA, sp. nov. (Fig. 73.)

Female. Length 5 mm. Ovipositor about 2 mm. Black or piceous, the abdomen, except apex reddish or brownish. Anterior legs reddish; middle and posterior pairs piceous or black. Specimen partly seen in ventral view, the head greatly widened behind; the large, externally arcuate mandible on one side showing very distinctly. Body behind the scutellum showing the dorsal view (i. e. the specimen split off to the dorsal wall). Metathorax distinctly rugose-reticulate. Abdomen as long as the head and thorax together; subpetiolate; first segment gradually widened from the base to the apex which is a little less than one-half as wide as long. Second segment as long as the first, but much wider than long; following together as long as the first two; apex obtusely pointed. Ovipositor preserved to a distance nearly equal to the length of the abdomen and possibly still longer. Legs moderately slender. Wings long and rather narrow, stigma and veins fuscous, the former short and broad, subtriangular. Radial cell long, almost attaining the wing tip, the first section of the radius less than one-half as long as the second. Three cubital cells, the second short, its inner side one-half longer than its upper. Recurrent nervure interstitial with the transverse cubitus; submedian cell as long as the median; discoidal nervure broken below the middle.

FIG. 73.—*Alysia petrina*, sp. nov. Type.

Type.—No. 2289 M. C. Z., Florissant, Col. (No. 8812, S. H. Scudder Coll.).

ALYSIA EXIGUA, sp. nov. (Fig. 74.)

Length 5 mm. Yellow or light colored, the tips of the mandibles, antennae, tarsi, and tips of posterior tibiae, black or blackish. The head and entire body are seen in ventral aspect. The mandibles are very large and prominent. Antennae slender, with more than twenty joints, their tips not being shown in the specimen; the joints near the base are from four to three times as long as thick, those nearer the apical portion becoming somewhat shorter. Legs rather long and stout, the posterior tibiae with a pair of long apical spurs. Wings long, hyaline, the veins very slender and weakly colored. Stigma ovate, rather

FIG. 74.—*Alysia exigua*, sp. nov. Type.

broad; marginal cell long and rather broad. From the contour of the radius there were probably three submargial cells, although the second transverse cubitus is obliterated in the specimen.

Type.—No. 2290, M. C. Z., Florissant, Col. (No. 4380, S. H. Scudder Coll.).

The type is rather poorly preserved.

BRACONIDAE.

This extensive family is not nearly so well represented in the collections from Florissant as is the Ichneumonidae, but this I believe is in great part due to the fact that a larger percentage of the specimens belonging here are but poorly preserved. From a count of specimens belonging definitely to one or the other of these families it is seen that the disparity in numbers is not so great as one might suspect from a comparison of the number of species I have described in each. The probable reasons for so many poorly preserved braconids have been suggested on a previous page.

The number of references by earlier writers is also quite limited, and aside from the Florissant material which I have studied, only four or five genera have been found fossil, *Macrocentrus*, *Chelonus*, *Agathis*, *Bracon*, and possibly *Hormiopterus*. In the Florissant fauna I have been able to recognize thirteen, several of them represented by more than one species.

The genus *Calyptites* described by Scudder from Quesnel, B. C., is undoubtedly an ant, the presence of a large costal cell in the wing described by Scudder at once removes the species from this family, and the venation is typically ant-like.¹

EUPHORINAE.

EUPHORUS INDURESCENS, sp. nov. (Fig. 75.)

Probably a female. Length 3 mm. Entirely brown or dark colored, with the legs distinctly lighter. Head globose, smooth and polished on the front and vertex, except for some coarse transverse rugae near the base of the antennae. Antennae distinctly thickened toward the tips, nearly as long as the

¹Prof. W. M. Wheeler has very kindly examined Scudder's figure and confirms (:08) my opinion that the species belongs to the Formicidae.

body; basal joints elongate; those near the middle quadrate and those toward the apex moniliform; the tips not preserved, but there were probably a few more than 20 joints. Thorax and abdomen seen in ventral view, the former ovate, distinctly less than two times as long as wide. Abdomen elongate ovate, with a stout, short petiole, the second segment more than four times as long as those following it combined. Wings not preserved. Legs slender.

Type.— No. 2336, M. C. Z., Florissant, Col. (No. 6620, S. H. Scudder Coll.).

One specimen, not showing many diagnostic characters, but without doubt a member of the Euphorinae and the first fossil member of the subfamily to be described. It resembles a belytid superficially, but there are too many joints to the antennae. This same resemblance is seen in recent forms, although it is of course entirely superficial.

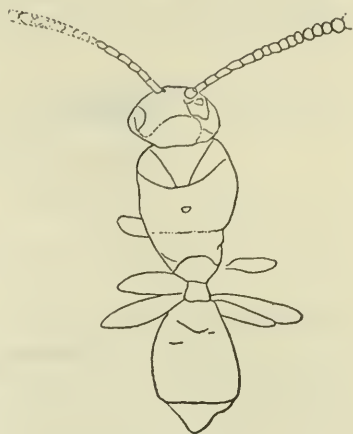


FIG. 75.— *Euphorus indurescens*, sp. nov. Type.

MACROCENTRINAE.

I have found no representatives of this group in the Florissant material, but *Macrocentrus* has been recorded from Baltic Amber by Brischke ('86).

HELCONINAE.

Two genera, *Diospilus* and *Dyscoletes* occur at Florissant, and are the first members of this subfamily to be found in the fossil state.

DIOSPILUS REPERTUS, sp. nov. (Fig. 76.)

Female. Length 4.75 mm. Black, the abdomen brown or piceous, legs ferruginous or yellowish brown. Antennae a little shorter than the body, about 30-jointed, slender and of even thickness. Surface of head and thorax smooth and shining; metathorax distinctly areolated and more or less distinctly granulated on the surface. Abdomen stout, swollen, about as long as the head and thorax together; second and third segments subequal, the longest; others about two-thirds as long and subequal among themselves.

Ovipositor not preserved, but it is distinct enough showing through the last abdominal segment to indicate that the specimen is a female. Wings slightly but quite evidently tinged with fuscous; stigma and veins fuscous, the former ovate, rather broad, the radius issuing far beyond the middle. Marginal cell



FIG. 76.— *Diospilus repertus*, sp. nov. Type.

rather long and acutely pointed at apex; first discoidal cell not petiolate above; submedian cell slightly longer than the median; second section of the radius nearly twice as long as the first and about as long as the second transverse cubitus; recurrent nervure inserted

considerably before the tip of the first cubital cell; inner and lower sides of the second cubital cell about equal, each longer than the two other sides which gives it the form of an oblique trapezoid; second discoidal cell closed at the tip, the subdiscoidal vein inserted far below the middle of the discoidal vein.

Type.— No. 2337–2338, M. C. Z., Florissant, Col. (No. 3411 and 7339 (reverse) S. H. Scudder Coll.).

The proper place to assign to this and the following species still remains in doubt and although they show some characters which might suggest the Macrocentrinae or even the Rhogadinae, I believe that both belong in the Helconinae. It is hardly to be hoped that specimens will be found showing the occipital margin or other characters necessary for a positive diagnosis, so I have ventured to describe them in the present somewhat problematic position.

A specimen later received from Professor Cockerell shows that the ovipositor is quite long, at least nearly equalling the abdomen, and in its habitus confirms my opinion that the species properly belongs here.

DYSCOLETES SOPORATUS, sp. nov. (Fig. 77.)

Female. Length 4.5 mm. Pale yellowish brown, the antennae and upper part of the head darker. Head and thorax smooth and shining. Antennae about as long as the body, slender and tapering near the tip, with about 30 or possibly a larger number of joints; those near the base long, four or five times as long as thick, but the apical ones very much shortened; those near the extreme tip rounded and almost moniliform. Metanotum at least partially areolated.



FIG. 77.— *Dyscoletes soporatus*, sp. nov. Type.

Abdomen ovate, broadly sessile, the second segment the longest, but the others nearly as long, growing very gradually shorter to the tip. Ovi-

positor exerted, but broken off about one millimeter from its base. Wings hyaline, the stigma and venation pale yellowish brown, the former rather broad, ovate, giving off the radial vein at its middle; marginal cell long, lanceolate; first discoidal cell distinctly petiolate; second cubital cell strongly narrowed above, its radial side only one-half as long as the cubital one. Recurrent nervure and first transverse cubitus interstitial, forming a straight line; second discoidal cell completely closed; discoidal vein broken very near the bottom; submedian cell distinctly longer than the median.

Type.—No. 2339, M. C. Z., Florissant, Col. (No. 13,360, S. H. Scudder Coll.).

This species reminds one both in form and color of certain species of *Macrocentrus*, but the short, high, second submarginal cell which is much contracted above does not agree with that genus. Unfortunately as is almost always the case, cephalic, thoracic, and pedal characters are not well enough preserved to permit of its positive location in any tribe, and the present generic reference can be considered as provisional only.

BLACINAE.

The following species of *Calyptus* is the only fossil species to be described in this group.

CALYPTUS WILMATTAE, sp. nov. (Fig. 78.)

Female. Length 4 mm. Ovipositor at least 2.5 mm. Dark colored, probably piceous or fuscous, the anterior part of the thorax below and the basal part of the abdomen lighter, more yellowish. Abdomen slightly longer than the head and thorax together, apparently gradually narrower from beyond the middle to the sessile base. Wings hyaline, or very slightly tinged with brownish; stigma and veins fuscous, the latter oval, only moderately broad, the radius originating beyond its



FIG. 78.—*Calpytus wilmattae*, sp. nov. Type.

middle. First discoidal cell sessile above; recurrent nervure parallel with the first transverse cubitus, received near the tip of the first cubital cell; marginal cell long, the radius strongly arcuate at the base, but nearly straight beyond; submedian cell considerably longer than the median; second discoidal cell completely closed; subdiscoidal vein inserted below the middle of the discoidal vein; anal cell apparently not divided. There is a constriction beyond the first transverse cubitus as though a second transverse cubitus were present, but in both otherwise finely preserved wings there is no trace of such nervure.

Described from one specimen collected by Mrs. W. P. Cockerell at Station 13B. It has very well preserved wings, although the body which is seen in ventral view shows few details. I cannot be positive that this is the proper location for the species, but I think it will be sought for in this group.

SIGALPHINAE.

No Sigalphinae are known to occur in other formations, and only one which is probably referable to *Urosigalphus* occurs at Florissant.

UROSIGALPHUS AETERNUS, sp. nov. (Fig. 79.)

Probably a female. Length 2 mm. Entirely black except for the tip of the abdominal carapace below, which is dark fuscous or piceous. Antennae very slender, of an indeterminate number of joints as the apices are not preserved; basal joints elongate, but those farther on (beyond the middle) quadrate and distinctly thicker than the basal ones. Surface of head and mesonotum shining, the pleurae below slightly and the abdominal carapace strongly rugose punctate in the manner characteristic of members of the subfamily. Abdomen very short and stout, scarcely longer than the head and thorax together, both of which are also stout. Wings nearly hyaline; stigma fuscous, veins pale brown; Radial vein originating just beyond the middle



FIG. 79.—*Urosigalphus aeternus*, sp. nov.
Type.

of the stigma, the radial cell short, ovate; two cubital cells, the first receiving the recurrent nervure at a distance before the tip equal to the length of the first section of the radius. Submedian vein not preserved.

One specimen and reverse, collected by Mr. S. A. Rohwer at Station 13. Type in the Amer. Mus. Nat. Hist.

This is quite a characteristic member of the Sigalphinae, but may not be a true Urosigalphus, since the length of the submedian cell cannot be determined.

CHELONINAE.

Both Gravenhorst ('35) and Brischke ('86) have found *Chelonus* in Baltic Amber, and the material which I have from Florissant contains three species of this same genus.

CHELONUS Jurine.

Key to the Florissant species of Chelonus.

1. Abdomen strongly longitudinally aciculated, wings infuscated. *C. muratus*, sp. nov.
Abdomen coriaceous, or irregularly rugose, wings hyaline or nearly so 2.
2. Pleurae very coarsely rugose *C. solidus*, sp. nov.
Pleurae only slightly rugulose, smooth below. *C. depressus*, sp. nov.

CHELONUS MURATUS, sp. nov. (Fig. 80.)

Length 3.5 mm. Small, black or dark colored, the abdomen lighter below. Antennae rather long, of the usual form, about 30-jointed, the joints becoming

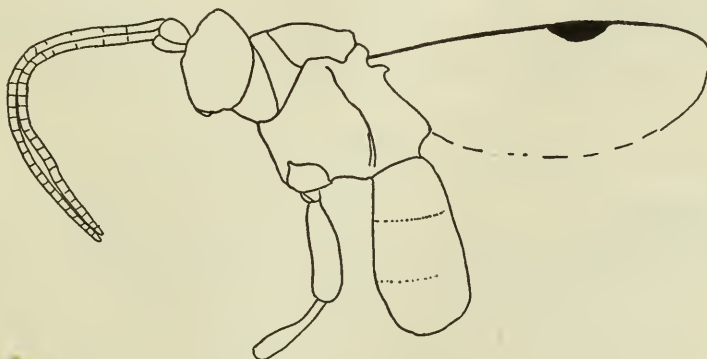


FIG. 80.—*Chelonus muratus*, sp. nov. Type.

very short toward the apex. Flagellum brown, scape black. Head finely lineately rugose or aciculate. Thorax finely rugulose or coriaceous, the pleurae

below more coarsely so and the metanotum rugose reticulate. Abdomen without any indications of sutures, elongate oval, rather more slender than usual, its thickest portion scarcely beyond the middle; its surface longitudinally aciculate with occasional reticulations. Legs, or at least the posterior femora dark in color. Wings rather strongly infuscated.

Type.—No. 2341, M. C. Z., Florissant, Col. (No. 9150, S. H. Scudder Coll.).

The type is not very well preserved, but is evidently specifically distinct from the other specimens of *Chelonus* in the collection.

CHELONUS SOLIDUS, sp. nov. (Fig. 81.)

Length 4.5 mm. Dark colored or black, the antennae including the scape light brown. Head finely rugulose, but not at all aciculated. Antennae not preserved at the tip, but their basal portion is apparently normal. Mesonotum rather finely rugose or coriaceous, the pleurae very coarsely rugose, especially below. Metanotum not visible as the legs are extended directly above it. Abdomen obovate, the thickest part near the tip; no traces of any transverse sutures. Its surface finely rugose reticulate as is usual



FIG. 81.—*Chelonus solidus* sp. nov. Type.

in the genus. Wings hyaline, the stigma and veins dark. Venation not well enough indicated to describe.

One specimen, No. A126, collected by Mr. S. A. Rohwer at Station 14. Type in the collection of the Amer. Mus. Nat. Hist.

CHELONUS DEPRESSUS, sp. nov.

Female? Length 4–4.5 mm. Color black or very dark, the antennae, and the legs, except the posterior femora and tibiae rather light brown. Antennae two-thirds as long as the body, about 25–30-jointed, setaceous, the small joints toward the apex quadrate-moniliform, and the larger basal joints from two to three times as long as thick; scape globose. Body rather strongly sculptured. Face confluent punctate, the front above, and the vertex also to some extent, transversely rugose. Pleurae slightly rugulose above, smooth below except along the sutures. Metanotum rugose, with reticulations posteriorly which form a series of more or less distinct small areas. Abdomen

coriaceous or rugulose, without traces of any sutures. Short, only as long as the thorax, elongate oval when seen from the side, the margin evenly rounded at the tip when seen from the side and rather pointed when seen from above. Wings hyaline, stigma large, light brown, venation almost effaced, but apparently identical with that of recent representatives of the genus.

Type.—No. 2342, M. C. Z., Florissant, Col. (No. 2077, S. H. Scudder Coll.). Nos. 2343–2344, M. C. Z., Florissant, Col. (Nos. 1917 and 5236, S. H. Scudder Coll.) also belong to this species. The Scudder Collection also contains two specimens (No. 11,404, M. C. Z., No. 2345, and No. 13,815, M. C. Z., 2346) which I doubtfully refer to this species.

AGATHIDINAE.

Serres, ('29) has recorded *Agathis* from Aix in the Lower Oligocene, and the Florissant beds have yielded the three species described below.

AGATHIS Latreille.

Key to the Florissant species of Agathis.

1. Second cubital cell (areola) small, strongly narrowed above or triangular, species small, 3.5–5 mm. 2.
Areola large, scarcely narrowed above, its upper side longer than the first section of the radius, large species, 7 mm.
A. saxatilis, sp. nov.
2. Areola triangular, touching the radius in a point, the second transverse cubitus hyaline, indistinct *A. velatus*, sp. nov.
Areola with a distinct upper side, although this is much shorter than the first section of the radius, second transverse cubitus fully colored *A. juvenilis*, sp. nov.

AGATHIS SAXATILIS, sp. nov. (Fig. 82.)

Length 7 mm. Probably dark colored or black. Antennae black, rather long and tapering, the joints near the base a little less than twice as long as thick, those toward the apex much smaller, but as long in proportion to their width. Surface of head smooth and polished. Thorax seen in dorsal view likewise shining, the sutures crenulate; metanotum with traces of a more or less distinct areolation. Abdomen somewhat lighter than the head and thorax, particularly at the base which was perhaps reddish or brownish in life. Wings apparently slightly infuscated, the veins very dark and heavy as

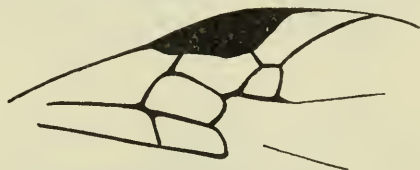


FIG. 82.—*Agathis saxatilis*, sp. nov.
Type.

usual in the genus. Stigma rather large, ovate, the lower edge strongly convex. Marginal cell short and narrow, its first section distinctly shorter than the second; third slightly bowed into the radial cell. Submedian cell slightly longer than the median; recurrent nervure at the apical fourth of the first cubital cell; first discoidal cell with a petiole above as long as the first section of the radius; second cubital cell larger than usual, distinctly quadrate, being but slightly narrowed above. Cubitus beyond the second transverse cubitus present but weak.

Described from one specimen, not very well preserved, except the anterior wings which serve to indicate its affinities without the least doubt.

Type.—No. 2348, M. C. Z., Florissant, Col. (No. 770, S. H. Scudder Coll.).

AGATHIS VELATUS, sp. nov. (Fig. 83.)

Female. Length 5 mm. Head and thorax black, abdomen brownish red, paler basally. Antennae about 25–35-jointed; not much tapering as



FIG. 83.—*Agathis velatus*, sp. nov. Type.

they are rather slender near the base; joints toward the base of the flagellum two to two and one-half times as long as thick; those near the apex much shorter, quadrate or nearly so. Head, mesonotum, and pleurae smooth and shining; meta-thorax with a few raised reticulate lines. Legs apparently light colored, except the posterior coxae and tarsi which are black. Ovipositor as long as the abdomen. Wings hyaline, the stigma and veins light brown. Stigma rather large, broad. Marginal cell very narrow, the second section of the radius rather strongly curved inwardly; second cubital cell small, triangular, its inner side strongly oblique, its

outer one weak, nearly hyaline, only slightly slanting.

Type.—No. 2349, M. C. Z., Florissant, Col. (No. 5339, S. H. Scudder Coll.). There is also a second specimen, No. 2350 M. C. Z., Florissant, Col. (No. 2509, Scudder Coll.) which is perhaps the same species. The body of the type is seen in lateral view and is rather well preserved. Of the wings only the radial cell and the second cubital are preserved, but these serve to show characters peculiar to this group.

AGATHIS JUVENILIS, sp. nov. (Fig. 84.)

Female. Length 3–3.25 mm. Black, with the abdomen light brownish yellow or reddish. Antennae short, slender, involute, of nearly equal thickness throughout, the joints near the base of the flagellum about one and one-half times as long as thick, and those toward the tip a trifle shorter. Head and entire thorax, including pleurae, shining. Ovipositor one and one-half



FIG. 84.— *Agathis juvenilis*, sp. nov. Type.

times as long as the abdomen. Wings hyaline, or slightly yellowish, stigma and veins pale fuscous. Stigma very broad and short; marginal cell narrow, the third section of the radius very slightly bent inward. Second cubital cell of medium size, with a distinct upper side, which is, however, much shorter than the first section of the radius.

One specimen, collected by Mr. S. A. Rohwer at Station 13. Type in the Amer. Mus. Nat. Hist., it is well preserved except for the basal and posterior parts of the wings.

MICROGASTERINAE.

This group has been found fossil so far only at Florissant. A species of *Microgaster* was described by the present writer (:06), and I can now add *Microplitis*, and another, *Oligoneuroides*, which appears to be new.

MICROGASTER PRIMORDIALIS Brues.

Bull. Amer. Mus. Nat. Hist., 1906, 22, p. 496.

This species was described from a single specimen from Florissant collected by Professor Cockerell, but there are in the collection of the Museum of Comparative Zoölogy Nos. 2354-2359, Florissant, Col., no less than five specimens which can be positively referred here (S. H. Scudder Coll. Nos. 3885, 5107, 5249, 6232, and 11,322-13,806. In addition there is another from Professor Cockerell and also five, Nos. 2360-2364 M. C. Z., Florissant, Col. (S. H. Scudder Coll. Nos. 2967, 3026, 5341, 5758, 10,947) which are doubtfully this species.

From the present series, the following characters can be added to those given in the original description:

Antennae 18-jointed, tapering, the joints about one and one-half times as long as thick apically, twice so toward the base. Abdomen sometimes quite dark in color, especially toward the base above; submedian cell longer than the median by one-third the length of the basal nervure. Legs brownish or reddish.

MICROPLITIS VESPERUS, sp. nov. (Fig. 85.)

Sex? Length 3.25 mm. Black, the abdomen more or less piceous; legs dark, wings hyaline. Antennae rather short and tapering evenly from the

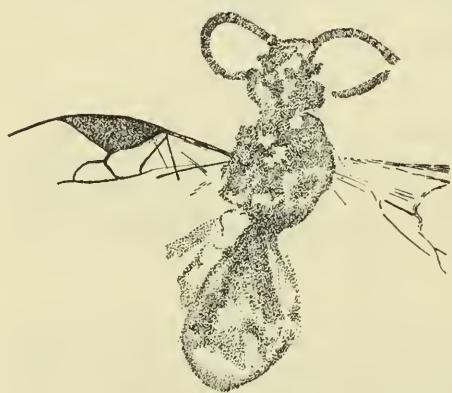


FIG. 85.—*Microplitis vesperus*, sp. nov.
Type.

base; apparently with about 18 joints, the basal flagellar joints two or more times as long as thick, the apical ones about quadrate. Head and thorax smooth and shining, the metathorax with indications of areolation. Abdomen short, scarcely longer than the thorax, shining. Legs not well preserved, but apparently rather stout. Wings broad, hyaline; the stigma broad, triangular, light colored as are also the veins; submedian cell much longer than the median, first discoidal cell above indistinctly petiolate; second cubital cell large, triangular, the cubitus prolonged a short distance beyond its apex; radius beyond the first short section wanting.

Described from one specimen sent by Professor Cockerell, A104. Type in the Amer. Mus. Nat. Hist.

This is a very extraordinary species on account of the very large triangular second cubital cell, but as it resembles otherwise the present genus closely, I have not thought it necessary to consider the character of generic value, although if found in living forms it would undoubtedly be so regarded.

OLIGONEUROIDES, gen. nov.

Antennae 25 or 26-jointed, probably 26. Wing venation much as in *Oligoneurus Szepligeti*, except that the first and second transverse cubital veins are present and the first discoidal cell is separated from the costa by a petiole over one-third the length of the basal vein.

Type.—*O. destructus*, sp. nov.

This peculiar form is undoubtedly a member of the *Microgasterinae* and on account of its multiarticulate antennae perhaps related to the Brazilian genus *Oligoneurus Szepligeti*. In wing venation, however, it is quite different and is I think worthy of generic rank.

OLIGONEUROIDES DESTRUCTUS, sp. nov. (Fig. 86.)

Female. Length 4 mm. Black, with reddish abdomen. Antennae and legs black or very dark. Basal joints of flagellum of antennae rather long, two to three times as long as thick; apically becoming more nearly quadrate and much smaller. Surface of head and thorax smooth and shining. Mesonotum apparently with parapsidal furrows which meet far before the scutellum. Abdomen short, globose, ovipositor at least two-thirds its length and possibly longer. Wings large and broad; radial vein abbreviated, but distinct for a considerable distance beyond the transverse cubitus. Submedian cell quite distinctly longer than the median; discoidal vein broken at its posterior tip, leaving the third discoidal cell open at the tip.



FIG. 86.—*Oligoneuroides destructus*, sp. nov. Type.

Type.—No. 2365, M. C. Z., Florissant, Col. (No. 857, S. H. Scudder Coll.).

Described from one specimen seen in dorsal view. It resembles *Microgaster primordialis* Brues in color and size, although otherwise far removed. Later a second specimen with reverse was sent in a lot received from Professor Cockerell, it agrees perfectly in structure and color, but the wing venation is not so well preserved.

OPIINAE.

There is a single poorly preserved specimen, No. 2294 M. C. Z. (No. 12,796, S. H. Scudder Coll.) which appears to belong to this group, but I cannot be positive. The marginal cell is very long and broad, reaching to the extreme tip of the wing, and the insect has the habitus of a *Cardiochiles*.

BRACONINAE.

But one genus, *Bracon* in the widest sense, has been found fossil. It is recorded from many localities, both in Amber and in rock formations. A list of these will be found in the catalogue accompanying the present paper. From Florissant, I have three species, one of them represented by a considerable number of specimens.

BRACON Fabricius.

Key to the Florissant species of Bracon.

- | | |
|---|----------------------------------|
| 1. Wings hyaline | 2. |
| Wings infuscated, length about 4 mm., second cubital cell twice as long as high at apex | <i>B. cockerelli</i> , sp. nov. |
| 2. Length 8.5 mm., second cubital cell long, nearly twice as long as high at apex | <i>B. abstractus</i> , sp. nov. |
| Length 12 mm.; second cubital cell but little longer than high; trapezoidal | <i>B. resurrectus</i> , sp. nov. |

BRACON COCKERELLI, sp. nov.

Female. Length 4 mm. Black or very dark, with the abdomen reddish, sometimes with indistinct darker, transverse bands. Wings infuscated, brown. Antennae black, 32-jointed, tapered beyond the middle to a slender tip; most of the flagellar joints about quadrate, the basal three or four joints of the flagellum from one-fourth to one-half longer than thick. Head and thorax shining, highly polished, impunctate. Abdomen subglobose or ovate both in lateral and dorsal view, about as long as the head and thorax together, acutely rounded at the tip. Ovipositor exerted, as long as the thorax and abdomen together. Legs moderately stout, yellowish or pale reddish brown, the tips of the tibiae and the tarsi (posterior legs?) darker, piceous. Wings very strongly infuscated and violaceous in some specimens. Stigma rather large and broadly

ovate, the radius originating from just before its middle, its first section two-thirds as long as the second, the two meeting at a very distinct angle; second cubital cell twice as long on the radius as it is high at the apex; recurrent nervure inserted just before the apex of the first cubital cell; median and submedian cells of equal length in both fore and hind wings.

Seven specimens, type Coll. Amer. Mus. Nat. Hist. A72, others: A31, A35, A128-129, A41; also Nos. 2367-2368, M. C. Z., Florissant, Col. (Nos. 6147 and 8602, S. H. Scudder Coll.). All are well preserved, and there are several others not so perfect which are probably this species, Nos. 2369-2372 M. C. Z., Florissant, Col. (Nos. 1707, 3640, 5032, 6338, S. H. Scudder Coll.). Professor Cockerell's specimens are from Stations 14 and 17.

This is a small species, very similar to the recent *Bracon dorsator* Say and its allies in general habitus.

BRACON ABSTRACTUS, sp. nov.

Female. Length 8.5 mm. Dark colored, the abdomen lighter, reddish except at the base; legs dark; wings hyaline. Antennae long and slender, with many joints (about 40), very gradually attenuated toward the tips; apical joints small, quadrate; those near the middle about twice as long as thick; basal ones still more elongate, three or more times as long as thick; abdomen as long as the head and thorax together, oval, roughly tuberculate on the basal two or three segments and less plainly so on the apical ones. Ovipositor exerted, but only a short basal part is preserved. Legs stout. Wings hyaline, the stigma and veins strongly colored; stigma small, narrowly ovate, very indistinctly angled below, the radius originating at or slightly beyond its middle. Radial cell long and narrow, pointed at the tip, its second section a little more than twice as long as the first; second cubital cell long, nearly twice as long as high at the apex.

Type.—No. 2373, M. C. Z., Florissant, Col. (No. 9276, S. H. Scudder Coll.).

This is similar to the preceding species in wing venation, but is much larger and has hyaline wings.

BRACON RESURRECTUS, sp. nov. (Fig. 87.)

Female. Length 12 mm. Ovipositor 12.5 mm. Apparently entirely light yellowish, the femora and tibiae of the posterior legs darker and the antennae brownish; head above and part of the dorsum of the thorax black-

ened. Wings hyaline. Antennae very long and slender, nearly as long as the



FIG. 87.—*Bracon resurrectus*, sp. nov. Type.

body and gradually attenuated toward the apex; very many jointed, the joints toward the tip short, quadrate, but those near the base considerably elongated, apparently from three to five times as long as thick. Thorax and abdomen only faintly preserved, apparently smooth and shining. Wings hyaline, the stigma and veins dark brown; stigma elongate, but distinctly angled below, the radius originating near its middle. Marginal cell narrow, elongate, acute at the tip; first and second sections of the radius both short, the second fully twice as long as the first; second cubital cell short, trapezoidal, but little longer than high;

median and submedian cells of front wing of equal length.

Described from one specimen and reverse, not particularly well preserved, but very striking on account of its large size. Nos. A137-138, collected at Station 14 by Mrs. W. P. Cockerell.

RHOGADINAE.

The only hitherto described fossil species belonging to this subfamily is *Rhogas tertarius*, Brues ('06) from Florissant, but later material from this locality contains the following species of *Exothecus*.

EXOTHECUS ABROGATUS, sp. nov. (Fig. 88.)

Length 5 mm. Ovipositor 6.5 mm. Black, the abdomen toward the tip and the legs brownish; wings hyaline or very slightly yellowish. Antennae piceous, extremely slender and presumably long, although only the basal part about two-thirds the length of the body is preserved; the joints appear to be elongate, about three times as long as thick. Head and thorax seen in lateral aspect, smooth and shining, the eye very large, round; metathorax finely areolate and propleura very finely rugosopunctate. Abdomen elongate,

claviform, seen from the side almost petiolate. First segment longer than the slope of the metathorax, finely longitudinally rugose; with a pair of median and lateral carinae which are continued less distinctly on the second segment; apex of abdomen rounded. Legs rather long and slender, brownish. Wings long and quite narrow; stigma and veins light fuscous. Stigma elongate, lanceolate, the radius arising at its middle; radial cell long, nearly attaining the wing tip; submedian cell considerably longer than the median; discoidal vein broken below the middle; recurrent nervure interstitial with the first transverse cubitus; first cubital cell rhomboidal, second elongate, its apex only one-half as long as its upper side and one-third as long as the lower side.



FIG. 88.—*Exothecus abrogatus*, sp. nov. Type.

Type.—No. A40, in the collection of the Amer. Mus. Nat. Hist.

This species resembles a genuine braconine except for the long submedian cell of the front wing.

SPATHIINAE.

I think it is very probable that *Ichneumon petrinus* Scudder belongs to this group. The very excellent figure given in his Tertiary Insects (plate 5, fig. 14) shows the characteristic form of the body and peculiar antennae of Hormiopterus and its allies, and I take it that the apparent absence of the first section of the cubitus is an accident of preservation.

STEPHANIDAE.

PROTOSTEPHANUS Cockerell.

There is one specimen, No. 5350, S. H. Scudder Coll., which may belong to this genus or perhaps to *Megischus*. It is not well enough preserved, however, to place definitely in either although I am assured from its general habitus that it belongs to the Stephanidae.

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I have omitted a few references which are of such general nature or so doubtful that they can be of little value to students. I have not attempted to change the places assigned to species by their describers or by previous writers except in a few cases where I am very positive that these are incorrect. On account of these omissions, a few species listed by Scudder and Handlirsch are not found in the present list, but it includes all that are of service to students of palaeontology.

BETHYLIDAE.

Bethylidae Handlirsch, Foss. ins., 1907, lief. 6, p. 858.

Lower Oligocene; Baltic Amber.

Bethylid (problematic) Brues, Bull. Amer. mus. nat. hist., 1906, 22, p. 497.

Miocene; Florissant, Col.

Epyris deletus Brues, Bull. M. C. Z., 1910, 54, p. 8.

Miocene; Florissant, Col.

CERAPHRONIDAE.

Ceraphron sp. Burmeister, Oken's Isis, 1831, p. 1100.

Lower Oligocene; Baltic Amber.

PROCTOTRYPIDAE.

Proctotrypes exhumatus Brues, Bull. M. C. Z., 1910, 54, p. 9.

Miocene; Florissant, Col.

BELYTIDAE.

Belyta mortuella Brues, Bull. M. C. Z., 1910, 54, p. 10.

Miocene; Florissant, Col.

Pantoclis deperdita Brues, Bull. Amer. mus. nat. hist., 1906, 22, p. 497.

Miocene; Florissant, Col.

DIAPRIIDAE.

Paramesius defectus Brues, Bull. M. C. Z., 1910, 54, p. 11.

Miocene; Florissant, Col.

Galesimorpha wheeleri Brues, Bull. M. C. Z., 1910, 54, p. 12.

Miocene; Florissant, Col.

FIGITIDAE.

Figites solus Brues, Bull. M. C. Z., 1910, 54, p. 13.

Miocene; Florissant, Col.

CYNIPIDAE.

Cynips sp. Schlotheim, Petrefactenk., 1820, p. 43.

Lower Oligocene; Baltic Amber.

Cynips succinea Presl., Delic. pragens., 1822, 1, p. 195.

Lower Oligocene; Baltic Amber.

Andricus myricae Brues, Bull. M. C. Z., 1910, 54, p. 14.

Miocene; Florissant, Col.

Diastrophus sp. Gravenhorst, Uebers, schles. gesellsch. vaterl. cult., 1834, 1835, p. 92.

Lower Oligocene; Baltic Amber.

Protoibalia connexiva Brues, Bull. M. C. Z., 1910, 54, p. 15.

Miocene; Florissant, Col.

AGAONIDAE.

Tetrapus mayri Brues, Bull. M. C. Z., 1910, 54, p. 16.

Miocene; Florissant, Col.

TORYMIDAE.

Torymus pertinax Förster, Abh. geol. spezialk. Els., 1891, 3, p. 452.

Middle Oligocene; Brunnstaad, Alsatia.

Torymus sackeni Brues, Bull. M. C. Z., 1910, 54, p. 17.

Miocene; Florissant, Col.

Palaeotorymus aciculatus Brues, Bull. M. C. Z., 1910, 54, p. 21.

Miocene; Florissant, Col.

Palaeotorymus laevis Brues, Bull. M. C. Z., 1910, 54, p. 20.

Miocene; Florissant, Col.

Palaeotorymus striatus Brues, Bull. M. C. Z., 1910, 54, p. 20.

Miocene; Florissant, Col.

Palaeotorymus typicus Brues, Bull. M. C. Z., 1910, 54, p. 19.

Miocene; Florissant, Col.

Ormyrodes petrefactus Brues, Bull. M. C. Z., 1910, 54, p. 21.

Miocene; Florissant, Col.

CHALCIDIDAE.

Chalcites debilis Heer, Viert. naturf. gesellsch. Zürich, 1856, 1, p. 29-30.

Lower Oligocene; Aix, France.

Chalcis perdita Brues, Bull. M. C. Z., 1910, 54, p. 24.

Miocene; Florissant, Col.

Chalcis praevalens Cockerell, Bull. Amer. mus. nat. hist., 1907, 23, p. 612.

Miocene; Florissant, Col.

Chalcis tortilis Brues, Bull. M. C. Z., 1910, 54, p. 23.

Miocene; Florissant, Col.

Spilochalcis scudderi Brues, Bull. M. C. Z., 1910, 54, p. 24.

Miocene; Florissant, Col.

EURYTOMIDAE.

Eurytoma sepulta Brues, Bull. M. C. Z., 1910, 54, p. 25.

Miocene; Florissant, Col.

Eurytoma sequax Brues, Bull. M. C. Z., 1910, 54, p. 26.

Miocene; Florissant, Col.

Decatoma antiqua Scudder, Bull. U. S. geol. surv. terr., 1878, 4, p. 749. Tertiary insects N. Amer., 1890, p. 604-605.

Oligocene; Green River, Wyoming.

PERILAMPIDAE.

Perilampus sp. Brischke, Schrift naturf. gesellsch. Danzig, 1886, 3, p. 279.

Lower Oligocene; Baltic Amber.

CLEONYMIDAE.

Cleonymus submersus Brues, Bull. M. C. Z., 1910, 54, p. 27.

Miocene; Florissant, Col.

PTEROMALIDAE.

Pteromalinites oeningensis Heer, Urwelt der Schweiz, 1865, p. 388.

Upper Miocene; Oeningen, Baden.

Pteromalus sp. Helm, Schrift naturf. gesellsch. Danzig, 1899, 10, p. 38. Lower Oligocene; Baltic Amber.

Pteromalus exanimis Brues, Bull. M. C. Z., 1910, 54, p. 27.
Miocene; Florissant, Col.

MYMARIDAE.

Anaphes schellwienicus Meunier, Ann. soc. sci. Bruxelles, 1901, 25, p. 284.

Lower Oligocene; Baltic Amber.

Anaphes splendens Meunier, Ann. soc. sci. Bruxelles, 1901, 25, p. 284.

Lower Oligocene; Baltic Amber.

Eustochus duisburgi Stein, Mittheil. Münch. entom. ver., 1877, 1, p. 30. (Mymar) Meunier, Ann. soc. sci. Bruxelles, 1901, 25, p. 290.

Lower Oligocene; Baltic Amber.

Gonatocerus henneberti Meunier, Miscell. ent., 1905, 13, p. 2.

Lower Oligocene; Baltic Amber.

Limacis baltica Meunier, Ann. soc. sci. Bruxelles, 1901, 25, p. 286.

Lower Oligocene; Baltic Amber.

Limacis armata Meunier, Miscell. ent. 1905, 13, p. 3.

Lower Oligocene; Baltic Amber.

Litus elegans Meunier, Ann. soc. sci. Bruxelles, 1901, 25, p. 285.

Lower Oligocene; Baltic Amber.

Malfattia molitorae Meunier, Ann. soc. sci. Bruxelles, 1901, 25, p. 287.

Lower Oligocene; Baltic Amber.

Mymar sp. Meunier, Ann. soc. sci. Bruxelles, 1901, 25, p. 288.

Lower Oligocene; Baltic Amber.

Palaeomymar succini Meunier, Ann. soc. sci. Bruxelles, 1901, 25, p. 289.

Lower Oligocene; Baltic Amber.

EVANIIDAE.

Evania sp. Burmeister, Oken's Isis, 1831, p. 1100.

Lower Oligocene; Baltic Amber.

Brachygaster sp. Brischke, Schrift. naturf. gesellsch. Danzig, 1886, 6, p. 278.

Lower Oligocene; Baltic Amber.

Aulacus bradleyi Brues, Bull. M. C. Z., 1910, 54, p. 28.

Miocene; Florissant, Col.

Pristaulacus rohweri Brues, Bull. M. C. Z., 1910, 54, p. 29.

Miocene; Florissant, Col.

ICHNEUMONIDAE.

Trogus vetus Brues, Bull. M. C. Z., 1910, 54, p. 31.

Miocene; Florissant, Col.

Ichneumon sp. Brischke, Schrift. naturf. gesellsch. Danzig, 1886, 6, p. 278.

Lower Oligocene; Baltic Amber.

Ichneumon sp. Curtis, Edinb. new philos. journ., 1829, 7, p. 295.

Lower Oligocene; Aix, France.

Ichneumon sp. Defrance, Dict. sc. nat., 1822, 23, p. 524.

Lower Oligocene; Baltic Amber.

Ichneumon sp. Gravenhorst, Uebers. schles. gesellsch. vaterl. cult., 1834, 1835, p. 92.

Lower Oligocene; Baltic Amber.

Ichneumon sp. Schlotheim, Petrefactenkunde, 1820, p. 43.

Lower Oligocene; Baltic Amber.

Ichneumon sp. Serres, Geogn. terrains tert., 1829, p. 229.

Lower Oligocene; Aix, France.

Ichneumon alpha Brues, Bull. M. C. Z., 1910, 54, p. 33.

Miocene; Florissant, Col.

Ichneumon aquensis Heer, Rech. climat. pays tert., 1861, p. 153.

Lower Oligocene; Aix, France.

Ichneumon cannoni Cockerell, Bull. M. C. Z., 1910, 54, p. 39.

Miocene; Florissant, Col.

Ichneumon concretus Brues, Bull. M. C. Z., 1910, 54, p. 40.

Miocene; Florissant, Col.

Ichneumon decrepitus Brues, Bull. M. C. Z., 1910, 54, p. 36.

Miocene; Florissant, Col.

Ichneumon dormitans Brues, Bull. M. C. Z., 1910, 54, p. 39.

Miocene; Florissant, Col.

Ichneumon exesus Brues, Bull. M. C. Z., 1910, 54, p. 37.

Miocene; Florissant, Col.

- Ichneumon infernalis* Heer, *Urwelt der Schweiz*, 1865, p. 294.
Upper Miocene; Oeningen, Baden.
- Ichneumon longaevus* Heer, *Insektenf. tertiärg.* Oeningen, 1849, 2, p. 166.
Lower Miocene; Radoboj, Croatia.
- Ichneumon obduratus* Brues, *Bull. M. C. Z.*, 1910, 54, p. 35.
Miocene; Florissant, Col.
- Ichneumon pollens* Brues, *Bull. M. C. Z.*, 1910, 54, p. 34.
Miocene; Florissant, Col.
- Ichneumon primigenius* Brues, *Bull. M. C. Z.*, 1910, 54, p. 35.
Miocene; Florissant, Col.
- Ichneumon provectus* Brues, *Bull. M. C. Z.*, 1910, 54, p. 38.
Miocene; Florissant, Col.
- Ichneumon somniatus* Brues, *Bull. M. C. Z.*, 1910, 54, p. 40.
Miocene; Florissant, Col.
- Ichneumon torpefactus* Brues, *Bull. M. C. Z.*, 1910, 54, p. 37.
Miocene; Florissant, Col.
- Amblyteles* sp. Schöberlin, *Soc. ent.*, 1888, 3, p. 61.
Upper Miocene; Oeningen, Baden.
- Ichneumonites bellus* Heer, *Neue denkschr.*, 1867, 22, (4), p. 35.
Upper Miocene; Oeningen, Baden.
- Phygadeuon* sp. Brischke, *Schrift. naturf. gesellsch.* Danzig, 1886, 6, p. 279.
Lower Oligocene; Baltic Amber.
- Phygadeuon* sp. Brues, *Bull. M. C. Z.*, 1910, 54, p. 41.
Miocene; Florissant, Col.
- Hemiteles* sp. Brischke, *Schrift. naturf. gesellsch.* Danzig, 1886, 6, p. 279.
Lower Oligocene; Baltic Amber.
- Hemiteles fasciatus* Heer, *Insektenf. tertiärg.* Oeningen, 1849, 2, p. 170.
Lower Miocene; Radoboj, Croatia.
- Hemiteles lapidescens* Brues, *Bull. M. C. Z.*, 1910, 54, p. 42.
Miocene; Florissant, Col.
- Hemiteles obtectus* Brues, *Bull. M. C. Z.*, 1910, 54, p. 43.
Miocene; Florissant, Col.

Hemiteles priscus Brues, Bull. M. C. Z., 1910, 54, p. 42.
Miocene; Florissant, Col.

Hemiteles veternus Brues, Bull. M. C. Z., 1910, 54, p. 44.
Miocene; Florissant, Col.

Pezomachus sp. Brischke, Schrift. naturf. gesellsch. Danzig, 1886, 6, p. 279.

Lower Oligocene; Baltic Amber.

Cryptus sp. Brischke, Schrift. naturf. gesellsch. Danzig, 1886, 6, p. 278.

Lower Oligocene; Baltic Amber.

Cryptus sp. Gravenhorst, Uebers. schles. gesellsch. vaterl. cult., 1834, 1835, p. 92.

Lower Oligocene; Baltic Amber.

Cryptus sp. Schöberlin, Soc. ent., 1888, 3, p. 61.

Upper Miocene; Oeningen, Baden.

Cryptus sp. Serres, Géogn. terrains tert., 1829, p. 229.

Lower Oligocene; Aix, France.

Cryptus antiquus Heer, Insektenf. tertiärg. Oeningen, 1849, 2, p. 168.

Upper Miocene; Oeningen, Baden.

Cryptus delineatus Brues, Bull. M. C. Z., 1910, 54, p. 44.

Miocene; Florissant, Col.

Mesostenus modestus Brues, Bull. Amer. mus. nat. hist., 1906, 22, p. 492.

Miocene; Florissant, Col.

Ichneumonites fusiformis Heer, Neue denkschr., 1867, 22, (4), p. 35.

Lower Miocene; Radoboj, Croatia.

Leptobatopsis ashmeadii Brues, Bull. M. C. Z., 1910, 54, p. 45.

Miocene; Florissant, Col.

Acoenites defunctus Brues, Bull. Amer. mus. nat. hist., 1906, 22, p. 493.

Miocene; Florissant, Col.

Acoenites lividus Heer, Insetenf. tertiärg. Oeningen., 1849, 2, p. 169.

Lower Miocene; Radoboj, Croatia.

Lampronota pristina Brues, Bull. M. C. Z., 1910, 54, p. 47.

Miocene; Florissant, Col.

- Lampronota stygialis* Brues, Bull. M. C. Z., 1910, 54, p. 47.
Miocene; Florissant, Col.
- Lampronota tenebrosa* Brues, Bull. M. C. Z., 1910, 54, p. 48.
Miocene; Florissant, Col.
- Rhyssa antiqua* Heer, Neue denkschr., 1867, 22, (4), p. 36.
Lower Miocene; Radoboj, Croatia.
- Rhyssa juvenis* Scudder, Tertiary insects N. Amer., 1890, p. 609.
Oligocene; Green River, Wyoming.
- Rhyssa petiolata* Brues, Bull. Amer. mus. nat. hist., 1906, 22, p. 494.
Miocene; Florissant, Col.
- Glypta aurora* Brues, Bull. M. C. Z., 1910, 54, p. 49.
Miocene; Florissant, Col.
- Glypta transversalis* Scudder, Tertiary insects N. Amer., 1890, p. 613.
Oligocene; Green River, Wyoming.
- Polysphincta inundata* Brues, Bull. M. C. Z., 1910, 54, p. 50.
Miocene; Florissant, Col.
- Polysphincta mortuaria* Brues, Bull. M. C. Z., 1910, 54, p. 50.
Miocene; Florissant, Col.
- Polysphincta petrorum* Brues, Bull. M. C. Z., 1910, 54, p. 51.
Miocene; Florissant, Col.
- Polysphincta saxea* Scudder, Rept. geol. surv. Canada, 1875-76, 1877, p. 268.
Oligocene; Quesnel, B. C.
- Pimpla* sp. Meunier, Ann. soc. sci. Bruxelles, 1896, 20, p. 277.
Upper Oligocene; Rott im Siebenbirge, Rheinlande.
- Pimpla* sp. Brues, Bull. M. C. Z., 1910, 54, p. 56.
Miocene; Florissant, Col.
- Pimpla* sp. Pictet, Traité de paléont. 2e. edit., 1854, p. 382.
Lower Oligocene; Aix, France.
- Pimpla antiqua* Sauss, Rev. mens. mag. zool., 1852, 4, p. 580.
Lower Oligocene; Aix, France.
- Pimpla appendigera* Brues, Bull. Amer. mus. nat. hist., 1906, 22, p. 494.
Miocene; Florissant, Col.
- Pimpla decessa* Scudder, Tertiary insects N. Amer., 1890, p. 612.
Oligocene; Quesnel, B. C.

- Pimpla morticina* Brues, Bull. M. C. Z., 1910, 54, p. 52.
Miocene; Florissant, Col.
- Pimpla rediviva* Brues, Bull. M. C. Z., 1910, 54, p. 54.
Miocene; Florissant, Col.
- Pimpla renevieri* Meunier, Mém. acad. Barcel., 1903, 4, p. 34.
Lower Oligocene; Aix, France.
- Pimpla revelata* Brues, Bull. M. C. Z., 1910, 54, p. 53.
Miocene; Florissant, Col.
- Pimpla saussurii* Heer, Viert. naturf. gesellsch. Zürich, 1856, 1, p. 29.
Lower Oligocene; Aix, France.
- Pimpla senecta* Scudder, Tertiary insects N. Amer., 1890, p. 611.
Oligocene; Quesnel, B. C.
- Pimpla senilis* Brues, Bull. M. C. Z., 1910, 54, p. 53.
Miocene; Florissant, Col.
- Pimpla succini* Giebel, Insect. d. vorwelt, 1856, p. 155.
Lower Oligocene; Baltic Amber.
- Xylonomus sejugatus* Brues, Bull. M. C. Z., 1910, 54, p. 55.
Miocene; Florissant, Col.
- Eclytus lutatus* Scudder, Tertiary insects N. Amer., 1890, p. 614.
Oligocene; Quesnel, B. C.
- Mesoleptus* sp.?. Brischke, Schrift. naturf. gesellsch. Danzig, 1886, 6, p. 279.
Lower Oligocene; Baltic Amber.
- Mesoleptus apertus* Brues, Bull. M. C. Z., 1910, 54, p. 56.
Miocene; Florissant, Col.
- Mesoleptus exstirpatus* Brues, Bull. M. C. Z., 1910, 54, p. 57.
Miocene; Florissant, Col.
- Tryphon* sp. Brischke, Schrift. naturf. gesellsch. Danzig, 1886, 6, p. 278.
Lower Oligocene; Baltic Amber.
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Miocene; Florissant, Col.
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Miocene; Florissant, Col.
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Miocene; Florissant, Col.

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Miocene; Florissant, Col.
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Miocene; Florissant, Col.
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Miocene; Florissant, Col.
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Miocene; Florissant, Col.
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Miocene; Florissant, Col.
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Lower Oligocene; Aix, France.
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Miocene; Florissant, Col.
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Miocene; Florissant, Col.
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Miocene; Florissant, Col.
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Miocene; Florissant, Col.

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Miocene; Florissant, Col.

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Miocene; Florissant, Col.
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Oligocene; Green River, Wyoming.
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Miocene; Florissant, Col.
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Miocene; Florissant, Col.
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Miocene; Florissant, Col.
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Miocene; Florissant, Col.
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Miocene; Florissant, Col.
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Miocene; Florissant, Col.

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Miocene; Florissant, Col.
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Miocene; Florissant, Col.

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Miocene; Florissant, Col.

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Miocene; Florissant, Col.

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Miocene; Florissant, Col.

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Lower Oligocene; Baltic Amber.

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Miocene; Florissant, Col.

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Miocene; Florissant, Col.

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Miocene; Florissant, Col.
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Miocene; Florissant, Col.
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